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ABSTRACT

This document contains 36 papers, most with critiques. Selected titles include "Qualitative Evaluation of the Strengths and Weaknesses of Pennsylvania's 4-H Program" (Etling); "Cognition Level of Instruction and Student Performance among Selected Ohio Production Agriculture Programs" (Cano, Newcomb); "Critical Thinking Skills of Agriculture Students" (Rollins, Miller, Kahler); "Factors Influencing the Decline in Enrollment of Junior High 4-H Club Members" (Burnett, Louque); "Factors Influencing the Occurrence of Adult Agricultural Education Programs" (Christmas, Warmbrod); "Factors Related to the Decisions of Rural Public High School Students to Participate in Vocational Education" (Elliot, McCracken); "Faculty Development Needs of Nevada Cooperative Extension" (Walters, Haskell); "How Practicing Agricultural Education Teachers View Preservice Courses with Implications for Teacher Education Reform" (Hillison, Burke); "Impact of Teacher Personality on Classroom Environment" (Barrett, Walla); "Integrating Biology and Agriculture" (Roegge, Russell); "Learning Styles Preferred by Students in Agriculture" (Rollins, Miller, Kahler); "Longitudinal Study of Undergraduate Agriculture Majors" (Tayson, Lee, Bowen); "Mission and Obstacles for Research in Agricultural Education" (Shinn, Buriak); "Participation and Persistence in Continuing Lifelong Learning Experiences of the Ohio Cooperative Extension Service" (Van Tilburg); "Perceptions of Secondary Agricultural Science Teachers toward Proposed Changes in Agricultural Curricula in Texas" (Norris, Briers); "Perceived Impact of Educational Reforms on High School Vocational Agriculture Programs" (Byler, Lamberth, Fletcher); "Preparedness for Teaching Vocational Agriculture" (Moss, Borne); "Problem-Solving Skills of Agricultural Education Undergraduates when Completing Mathematical Word Problems in Agricultural Mechanics" (Gliem, Elliot); "Relationship of Supervised Occupational Experience Program Scope to Student Achievement in

Vocational Agriculture" (Arrington, Cheek); "Student Misbehavior in Vocational Agriculture and Other Vocational Programs: A Comparison" (Moore, Burnett); "Teaching Critical Thinking as Perceived by Iowa Vocational Agriculture Instructors" (Ware, Kahler); "Impact of an Experienced-Based School Enrichment Program in Plant Science on Third Grade Students' Self-Esteem" (Cantrell, Goodson); "Vocational Enrollment Patterns and Occupational Aspirations of American High School Students in 1982: A Causal Analysis" (Smick, Camp); "Vocational Supervisor Burnout and Job Satisfaction" (Barrick, Clark, Newcomb); and "Directing Future Research Efforts in Agricultural and Extension Education through a Matrix" (Crunkilton). (KC)

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RESEARCH IN AGRICULTURAL EDUCATION:

A FOUNDATION FOR EXCELLENCE

PROCEEDINGS OF THE FIFTEENTH
NATIONAL AGRICULTURAL EDUCATION
RESEARCH MEETING

VOLUME XV

December 2, 1988
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Preface

Research conducted by leaders in agricultural education provides an essential element for continuing the excellence of agriculture programs at all levels. Since 1974 members of the profession have met annually during the American Vocational Association Annual Conference to exchange results of current research and to discuss future research issues and priorities. To provide a framework for research in agricultural and extension education, John Crunkilton, Professor of Agricultural Education at VPI & SU, concluded the 1988 NAERM with a presentation designed to provide a structure for future research efforts. The Fifteenth National Agricultural Education Research Meeting (NAERM) was attended by approximately 175 individuals. Previous national research meetings include:

Number	Year	Location	Chairperson
1	1974	New Orleans,LA	Hollie Thomas, Florida State
2	1975	Anaheim, CA	Hollie Thomas, Florida State
3	1976	Houston, TX	Glen Shinn, Mississippi State
4	1977	Atlantic City, NJ	William Richardson, Purdue
5	1978	Dallas, TX	Bennie Byler, Mississippi State
6	1979	Anaheim, CA	Ronald Brown, Mississippi State
7	1980	New Orleans, LA	L. H. Newcomb, Ohio State
8	1981	Atlanta, GA	Maynard Iverson, N. C. State
9	1982	St. Louis, MO	Dale Oliver, VPI & SU
10	1983	Anaheim, CA	Paul Vaughn, New Mexico State
11	1984	New Orleans, LA	Jimmy Cheek, Univ. of Florida
12	1985	Atlanta, GA	Bob Stewart, Univ. of Missouri
13	1986	Dallas, TX	Alan Kahler, Iowa State
14	1987	Las Vegas, NV	Al Mannebach, Connecticut

The 1988 program included presentation of 36 referred papers. There were a total of 98 papers submitted for review. The acceptance rate was 36.7 percent . A blind, peer-review process was used in the selection of papers for presentation. A total of 30 agricultural education professionals assisted in the review process. Their review results provided the basis for identifying the 36 papers for presentation and subsequent publication in volume XV of the NAERM proceedings.

Sincere thanks are extended to the paper presenters, discussants, chairpersons and facilitators for assisting with the 1988 NAERM. Sincere thanks to Bob Stuart, University of Missouri, for assisting with facility arrangements.

Ed Yoder, Chairperson

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A COMPARISON OF THE PERCEPTIONS OF THREE GROUPS CONCERNING EMPHASIS OF AGRICULTURAL SUBJECT MATTER IN THE LOCAL VOCATIONAL AGRICULTURE CURRICULUM

Roy D. Dillon, Professor
University of Nebraska-Lincoln

An important factor for teacher educators to consider when selecting a secondary school and supervising teacher to be used for student teaching is the curriculum in vocational agriculture. As pointed out by Phipps (1980), a carefully worked out agriculture curriculum is essential if students are to receive the full benefit of the local program. Phipps stressed that school administrators, the agriculture teacher, state supervisors of agricultural education, and the local advisory council should have part in the decision of the content to be included in the local vocational agriculture curriculum. If this coordinated action occurs, there should be a similar perception held by all four groups concerning the content and emphasis in the local vocational agriculture program.

In the first annual report of the National Advisory Council on Vocational Education (1969), recommendations stated a need for more emphasis on attitudes regarding vocational education. Viterna (1971) stated that school administrator's decisions drastically influence vocational agriculture program operations and directions. Thompson (1986) found differences between superintendents, agriculture teachers, and vocational agriculture students regarding their perception of the goals and objectives of FFA, Supervised Occupational Experience (SOE), and the instructional program.

It would seem reasonable that the closer the perceptions of the secondary principal, the vocational agriculture teacher, and the secondary vocational agriculture students concerning the content and emphasis of the local vocational agriculture program, the more accurate would be the student teacher's understanding of the agriculture curriculum being offered by the school, and the more accurate would be the perceptions of persons outside the school.

PURPOSE

The purpose of this study was to determine the extent of agreement among secondary school principals, vocational agriculture teachers, and senior secondary vocational agriculture students concerning their perception of the emphasis placed on thirty-two agriculture/agribusiness subject matter areas in the vocational agriculture curriculum.

PROCEDURES

Population and Sample

A random sample of 48 or 35 percent of the secondary vocational agriculture teachers was drawn from a list of the 1987 Nebraska secondary vocational agriculture teachers. Each teacher was contacted by telephone to determine their willingness to participate in the study. All 48 teachers replied affirmatively.

Instrumentation

A questionnaire was developed which listed 32 agriculture/agribusiness subject matter areas, based on the Nebraska Vocational Agriculture Core Curriculum. Similar research by Walton (1979), Williams (1977), and Thompson (1986) also provided input for the instrument.

The thirty-two agricultural subject matter areas were placed into the eight subject groups. These were:

Animal Production; five subject areas:

a. Beef Cattle Production (Cow/Calf, Feedlot, Backgrounding, Purebred Breeding).

b. Swine Production (Farrow to Finish, Feeder Pigs, Market Hogs, Purebred Breeder)

c. Sheep Production (Ewe and Lamb, Feedlot, Purebred Breeder).

d. Horse Production (Purebreeder, Trainer, Racing Horses).

e. Dairy Production (Milk Production, Purebred Breeding).

Agricultural Mechanics; eight areas:

a. Metal Work (Welding, Forge, Cold & Sheet Metal).

b. Tractors (Maintenance, Engine Overhaul).

c. Electricity (Circuits, Basic Wiring, Motors Care).

d. Agricultural Field Machinery (Hand & Power Tool Care, Maintenance, Calibration).

e. Small Engines (Overhaul & Maintenance).

f. Concrete Work (Foundations, Slabs).

g. Carpentry (Hand & Power Tool Care, Small Building Construction).

h. Irrigation Equipment Maintenance.

Crop Production; five subject areas:

a. Row Crop Production (Corn, Sorghum, Soybeans, Sunflowers).

b. Small Grain Production (Wheat, Oats, Rye).

c. Forage & Hay Production (Hay, Silage, DeHy-Alfalfa).

d. Soil Conservation Practices (Land use, Land Evaluation, Service, Practices.

e. High Value Crops (Sugar Beets, Dry Beans, Potatoes, Veg.).

Management; six subject areas:

a. Agricultural Records, (Farm, Record Keeping, Net Worth Statement).

b. Financing the Farm Business.

c. Insurance (Types Needed, Sources).

d. Tax Management

e. Machinery & Equipment Management

f. Marketing Agriculture Products (Systems, Hedging, Wholesale, Retail).

Renewable Natural Resources; one subject area:

a. Renewable natural Resources (Fish & Wildlife, Pollution, Forestry, Recreation).

Agribusiness; four subject area;

a. Machinery Service & Sales (Parts Person, Sales, Bookkeeping).

b. Processing Agricultural Products (Cereal Grains, Meat, Eggs, Vegetables).

c. Horticulture (Nursery & Shrub Production, Greenhouse, House Plants).

d. Small Animals (Small Animal Care, Lab Animals, Bee Keeper).

Supervised Occupational Experience Programs; one subject area:

a. Supervised Experience Programs (Production Projects, School Land, Lab Experience on Farm or on Job Placement, and Record Keeping)

Agricultural Leadership and Careers; two subject areas:

a. Leadership (FFA Org. & Operations, Agricultural Organizations).

b. Agricultural Careers (Identification, Exploration, Selection).

The list of eight subject groups and thirty-two subject matter areas were validated through a jury review which included two teacher educators, two State Department of Education Vocational Agriculture Consultants, and four vocational agriculture teachers not in the sample.

Data Collection

The questionnaires were mailed to the 48 agriculture teachers. Each teacher was asked to have their secondary school principal and senior vocational agriculture students complete the form, and the teacher was to complete a copy.

The respondent was asked to indicate the degree of emphasis being placed on each of the 32 subject matter areas of agriculture/agribusiness in their local vocational agriculture program over the past four years, using the following scale:

"3" = Major Emphasis - in-depth classroom instruction, for a significant length of time - 30 or more hours.

"2" = Moderate Emphasis - some classroom instruction, limited amount of time - 6 to 29 hours.

"1" = No Emphasis - no content taught in this area.

Data Analysis

An analysis of variance procedure was conducted to determine if there was a significant difference among the means for each of the three respondent groups, for each of the eight subject areas. An alpha level of .01 was established.

In cases where a significant difference was found, the Scheffe' Test for unequal group sizes was conducted to determine which respondent groups differed, using an alpha level of .05.

RESULTS

Responses were received from 45 secondary school principals, 45 agriculture teachers, and 273 senior vocational agriculture students. This was a 93.75 percent response.

As shown in Table 1, significant differences were found among the three respondent groups for six of the eight agriculture subject groups studied. Secondary principals held a significantly higher perception of the emphasis placed on the two agriculture subject groups of Management and Agribusiness, than did both vocational agriculture teachers and senior secondary vocational agriculture students.

Secondary principals also held a significantly higher perception of the emphasis placed on the three agriculture subject groups of Animal Production, Crop Production, and Leadership and Careers, than did senior secondary vocational agriculture students.

Secondary principals and vocational agriculture teachers held a significantly higher perception of the emphasis placed on the one agriculture subject group of Agricultural Mechanics, than did senior secondary vocational agricultural students.

CONCLUSIONS AND DISCUSSION

The important conclusion to be drawn from the study is that secondary principals in Nebraska appear to believe a much greater emphasis is placed on agricultural subject matter in vocational agriculture curriculums than do teachers of vocational agriculture or senior secondary vocational agriculture students.

Secondary principals, vocational agriculture teachers, and senior secondary vocational agriculture students all perceive there is moderate to major emphasis placed on Supervised Occupational Experience Programs in the local vocational agriculture program. This conclusion may indicate that the visibility of this phase of the local vocational agriculture program contributes directly to the congruent perception among the three respondent groups.

Vocational agriculture teachers and senior secondary vocational agriculture students agreed in their perception of the emphasis placed on seven of the eight agriculture subject groups. The difference between the teachers and students in the Agricultural Mechanics subject group may be because students are defining the agricultural mechanics emphasis based on time actually spent in the agricultural mechanics laboratory, while teachers may include the classroom instructional time in agricultural mechanics topics.

The senior secondary vocational agriculture students, recipients of the instruction, appear to have the perception that little to moderate emphasis

TABLE 1

Mean Scores and F Values for Eight Agriculture Subject Groups by Respondent Group

Subject Group	Mean Score by Respondent Group			F Value
	Secondary Principals	Agri. Teachers	Secondary Agri. Students	
Animal Production	1.867	1.653	1.470	7.652
Crop Production	1.933	1.682	1.462	11.637
Agricultural Mechanics	1.905	1.974	1.594	9.225
Management	2.248	1.961	1.744	17.213
Agribusiness	1.23	0.882	0.873	6.063
Renewable Natural Resources	1.333	0.941	1.030	1.938
Supervised Occupational Experience Programs	2.606	2.647	2.348	3.666
Agricultural Careers	2.515	2.250	2.018	11.836

Note: Mean scores connected by a common line differ significantly, $p < .05$ Scheffe.

is placed on six of the eight agriculture subject groups, and that only moderate emphasis is placed on instruction dealing with Supervised Occupational Experience Programs and Agricultural Leadership and Careers.

Agribusiness subject matter is just now emerging in Nebraska vocational agriculture curriculums, and the finding that there is little emphasis now placed on that agricultural content accurately reflects the situation. However, secondary principals perceive that greater emphasis is placed in this subject area than both vocational agriculture teachers and senior secondary agriculture students.

The results of this study support the work of Viterina (1971) and Thompson (1986), and suggests that secondary principals do not understand the vocational agriculture curriculum.

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A COMPARISON OF THE PERCEPTIONS OF THREE GROUPS CONCERNING EMPHASIS OF AGRICULTURAL SUBJECT MATTER IN THE LOCAL VOCATIONAL AGRICULTURE CURRICULUM

Rodney W. Tulloch, University of Kentucky -- Discussant

This study was clearly presented and easy to read. The perceptions of and agreement among the 3 groups is important and an interesting and reasonable topic for study.

The third paragraph stated as follows, "It would seem reasonable that the closer the perceptions of the secondary vocational agriculture students concerning the content and emphasis of the local vocational agriculture program, the more accurate would be the student teacher's understanding of the agriculture curriculum being offered by the school, and the more accurate would be the perceptions of persons outside the school," but do we have any proof that it makes any difference?

Does the variation in the number of agricultural subject matter areas listed in the eight subject groups affect the perceived importance of a coverage of the group? The number of areas in a group varied from one to eight.

Why was a 3 point scale used? The scale skipped from no emphasis to 6-29 hours leaving out everything from 1-5 hours. Should there have been an, "I don't know on the scale?"

The method of validation of the instrument was discussed but no mention of reliability was evident.

Why did the alpha levels change from ANOVA to post hoc analysis?

Discriminant analysis could have been used to establish if the three groups were different in relation to the 32 items and to determine which of the 32 could be used to establish differences between the groups.

A QUALITATIVE EVALUATION OF THE STRENGTHS AND WEAKNESSES OF PENNSYLVANIA'S 4-H PROGRAM

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INTRODUCTION

> Today we live in a world where change is no longer the exception--it is the norm. More than ever, youth need education and skill to cope with increasing technical, social, and economic changes. Extension leaders recognize that to meet the needs of clientele now and in the future, 4-H must change and redirect its youth educational efforts (U.S.D.A., 1987, p. 1).

Recent U.S.D.A. reports indicated turbulence in 4-H programming nationwide. Instability of funding, staffing patterns that do not match present and future needs, problems of roles and relationships among 4-H professionals and volunteers, and the need to revise curriculum to meet societal needs of youth were mentioned (U.S.D.A., 1987; U.S.D.A., 1983; ECOP, 1987). Warner and Christenson (1984) reported that young people and low income persons are more dissatisfied with extension than most groups (p. 79). They mentioned the need to examine program delivery as well as content for relevance to changing clientele (p. 71).

Changes of 4-H leadership in the various states have been documented. According to Boyce (1988) 26 of 56 state 4-H program director positions were projected to be open between 1985 and 1990. 4-H also had a problem with identity. A general "...lack of understanding of 4-H within the land-grant university and U.S.D.A. system" was observed by U.S.D.A. (1987, p. 14).

Turbulent change has also characterized Pennsylvania 4-H. Within the past three years a new State 4-H Director and a new Ag College Dean brought new approaches to the program which included merging the 4-H program into the Department of Agricultural and Extension Education. The Director of Extension retired in 1987; regional 4-H administrative positions were eliminated; and new computer reporting system was installed for Extension. Also in 1987 the Pennsylvania Legislature approved a $5 million appropriation to strengthen Cooperative Extension in the state. This money allowed frozen positions to be filled and added new 4-H positions at both county and state levels.

Plans of work for Cooperative Extension in Pennsylvania also indicated changes in program content and delivery for the 4-H program in order to respond to changes in clientele. A new emphasis was placed on systematic needs assessment to guide program, including curriculum, development. A new process for orienting new extension professionals was proposed (College of Agriculture, 1988).

As a result of these problems U.S.D.A. (1987, p. 3) set three priorities for research. These included the process of youth development, methods of experiential youth education, and organizational renewal. Pennsylvania 4-H concurred with these priorities.

PURPOSE AND OBJECTIVES

Such sweeping changes provided the background for conducting a study to determine the strengths and weaknesses of Pennsylvania's 4-H program. Specific objectives were:

1. To identify the perceptions of 4-H professionals regarding inputs and results in the 4-H program;

2. to describe stakeholders' perceptions of Pennsylvania 4-H; and
3. to compare the professionals' perceived program model with stakeholders' perceptions.

PROCEDURES

Quantitative research methods did not seem to be suited to address the objectives of this study. 4-H specialists agreed with McKinney's (1987) concerns that quantitative research relies too much on empirical-analytical perspective , does not sufficiently consider the context of programs being studied, and excessively emphasizes separate and discrete outcomes.

A qualitative research approach, evaluability assessment, seemed most appropriate to achieve the objectives of the study. Evaluability assessment was a procedure which

> ...explores and documents: the program objectives, expectations, and casual assumptions of policy-makers and managers in charge of program; what political groups (Congress, Executive Branch policy-makers, and interest groups) say the the program objectives are; the extent to which management's program objectives and information needs have been defined in measurable terms; the program activities actually under way; the likelihood that program activities will achieve measurable progress toward program objectives; likely uses of information on program performance; and options for changes in program activities, objectives, and use of information that could enhance program performance (Wholey, 1979, p. 18).

An evaluation specialist at the U.S. Department of Agriculture agreed to assist with the study. He was in the process of conducting a number of evaluability assessments for different state extension programs to validate the method.

Steps in the evaluability assessment followed those described by Wholey (1979) and adapted by Mayeske (1986). A study committee was formed to represent Pennsylvania 4-H at all professional levels. Members included five county 4-H agents, two state 4-H specialists, the state 4-H program director, the state extension evaluation specialist, and a federal extension evaluation specialist.

Through structured discussions the study committee formulated a program logic model of inputs and results (Figure 1) and specified activities and indicators of accomplishment at each stage of the model. Next the study committee identified groups of Pennsylvania residents besides 4-H members, who had a stake in the 4-H program's development, implementation, reputation or impact. These 13 groups, designated "stakeholders," included Penn State University administrators, College of Agriculture administrators, county commissioners, state legislators, State 4-H Foundation directors and donors, county extension advisory committee members, county extension directors, county 4-H coordinators, other county agents with 4-H responsibilities, 4-H volunteer leaders, parents, state 4-H specialists, and representatives of other agencies that work with 4-H.

A purposive sample of 47 individuals including at least three representatives of each stakeholder group was chosen by the study committee. The sample was balanced geographically, ethnically and by gender. Then the committee developed the interview questionnaire which was critiqued by federal and state evaluation specialists for content validity.

Four students in the Extension Education Minor at Penn State and the state evaluation specialist agreed to conduct the interviews. Four hours of training on the basic principles of

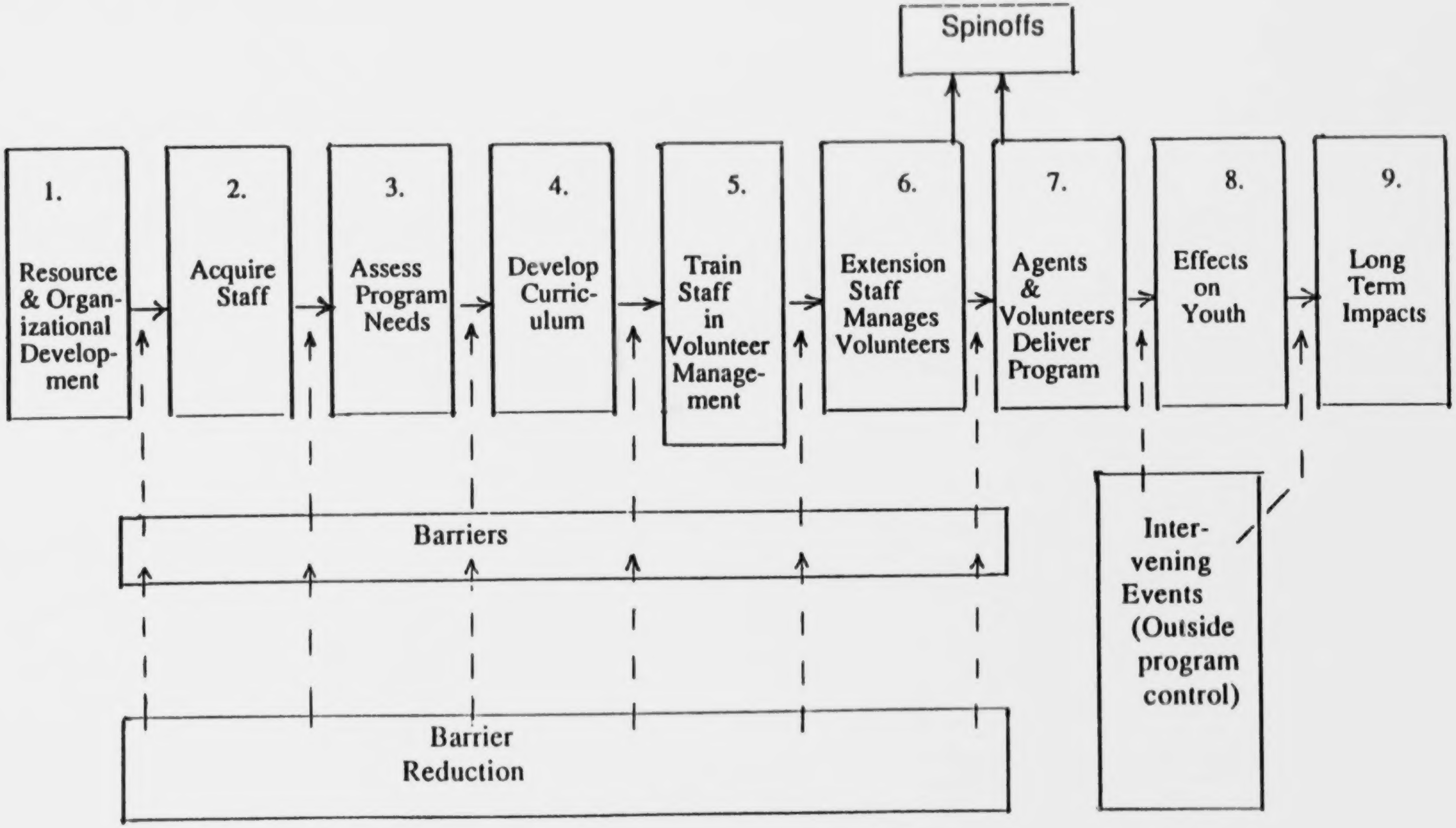
Spinoffs
1. Resource & Organizational Development
2. Acquire Staff
3. Assess Program Needs
4. Develop Curriculum
5. Train Staff in Volunteer Management
6. Extension Staff Manages Volunteers
7. Agents & Volunteers Deliver Program
8. Effects on Youth
9. Long Term Impacts
Barriers
Barrier Reduction
Intervening Events (Outside program control)

Figure 1.

Logic Model -- Pennsylvania 4-H

interviewing were completed by all interviewers who were trained to deal with a variety of situations that could affect the validity of the interviews. Neutrality and consistency were emphasized. Standardized answers were developed for potential queries about the meaning of certain questions and the reason for the study.

Stakeholders were contacted by letter, then by phone. In some cases the interview was completed on the first contact. In other cases up to 14 calls were needed, usually due to secretaries who were screening calls for their employers. Several sensitive interviews were conducted in person by the state evaluation specialist. Figure 2 shows the interview questions.

1. What are your overall perceptions of the 4-H program in Pennsylvania?
2. What do you think is the purpose of 4-H?
3. Do you think the purpose of 4-H should be different?
4. Who is served by the 4-H program?
5. What are the effects of the 4-H program on the participants; in other words, how are they different as a result of being in the program?
6. What is the County Extension staff expected to do to bring about the effects of the 4-H program?
7. What is the State Extension staff on campus expected to do to bring about the effects of the 4-H program?
8. Do you have any other thoughts about how the 4-H program is carried out?
9. Do you think the resources of the program are adequate? (If "No," ask, "What more is needed?")
10. If the 4-H program were to undergo a formal evaluation, what would you like to know about it?
11. What do you think is the future of 4-H in Pennsylvania?
12. In what ways do you think the 4-H program should change to meet future needs?
13. Is there anything else you would like to mention concerning the 4-H program in Pennsylvania?

Figure 2
Interview Questionnaire

In the end 45 interviews were completed (96% completion rate). Each interview was taped and transcribed. The typed transcriptions were placed in folders by stakeholder category for analysis. All names were deleted from transcribed copies to protect the anonymity of stakeholders.

ANALYSIS OF DATA

The study committee met a second time to review the interview results. In accordance with accepted procedure for this type of qualitative study (Wholey, 1979; Mayeske, 1986) a structured group discussion was used by the study committee. This allowed the study committee to take account of the context of the 4-H program while analyzing and comparing perceptions of discrete parts of that program. In pairs, committee members read and summarized the typed transcripts from each stakeholder category. Responses among stakeholder categories were compared. Then the committee compared stakeholder perceptions with the logic model (Figure 1).

RESULTS

With regard to objective one, the inputs and results in Pennsylvania's 4-H program were identified and described in a logic model (Figure 1). In addition activities and indicators of accomplishment were listed for each stage of the logic model. Faculty resources were specified which were necessary to complete each stage.

For objective 2 stakeholders' perceptions of 4-H in Pennsylvania were identified from the interview transcriptions. Stakeholders indicated that they liked 4-H and did not want its purpose to change. However they were reluctant or unable to state the purpose. Many respondents indicated that 4-H should expand opportunities for urban and suburban audiences.

Some 4-H agents and specialists expressed difficulty in identifying a satisfactory role for themselves. Other responses indicated agents' frustrations with a long period of adjustment to 4-H work. Still other responses indicated lack of clarity with the agent-volunteer relationship.

Respondents indicated different expectations for curriculum needs and for program delivery. Likewise materials for recruiting and training volunteers were identified as a need. Several new program suggestions were made by respondents especially to attract and retain teen 4-H members. Underlying all of these proposals was the expressed need to maintain and increase financial support.

In comparing the professionals' program model with stakeholders' perceptions (objective 3) the study committee found no conflicts. Stakeholders, particularly those who were volunteers or outsiders, were not aware of the entire logic model. All were aware of parts of the model. Some responses emphasized only agricultural or home economics subject matter.

RECOMMENDATIONS

Based on these findings, study committee recommendations for objective one were to:

--create and promote a realistic image of 4-H,
--develop and communicate a unified philosophy of the 4-H program, and
--develop a framework for communicating life skill effects of 4-H.

For objective two the recommendations of the study committee were to:

--inform stakeholders of program purpose,
--strengthen 4-H programming for urban and suburban youth,

--clarify the county agent's role in carrying out the program,
--clarify the state specialist's role in carrying out the program,
--implement the proposed orientation plan for new staff,
--clarify the agent-volunteer relationship,
--develop training materials for use with volunteers,
--describe an ideal curriculum development model and implement it,
--develop guidelines for program delivery,
--review recruitment/hiring procedures,
--pilot test new approaches and programs for teens, and
--increase priority given to 4-H fund raising.

Recommendations related to objective three were to:

--organize communication with the various categories of stakeholders and communicate with them on a regular basis,
--make 4-H professionals aware of these recommendations as future programming efforts are developed,
--conduct further studies of 4-H program inputs and results, and
--use evaluability assessment with other extension programs since it was less costly than an impact study, it clarified inputs and results that may have been overlooked by quantitative research, and therefore it is an appropriate method of qualitative research.

CONCLUSION

The evaluability assessment did not produce any major surprises or conflicts, but it did systematically document the strengths and weaknesses of the overall program. Recommendations were developed which detail actions needed to improve the effectiveness and extensiveness (both in terms of target audience and youth needs programming) of the 4-H program.

The results of this study will be useful in future deliberations on 4-H programming priorities. The study has also provided a logic model that will be useful when designing a future impact study of the 4-H program in Pennsylvania.

IMPLICATIONS FOR FURTHER STUDY

Further research on several topics is suggested by this study:

1. what are alternative approaches for increasing 4-H enrollment;
2. what needs of urban and suburban youth should 4-H address;
3. how do different stakeholder groups view the 4-H agent role;
4. what are new worker orientation models that might lessen the frustrations and shorten the period of adjustment;
5. what are some guidelines for an appropriate agent-volunteer relationship;
6. what curriculum development model would work best for Pennsylvania;
7. what are the best training models for volunteers;
8. why do teens drop out or stay in 4-H;
9. what new curriculum materials are needed most;
10. under what conditions are the various program delivery methods most effective;
11. what is the most useful needs assessment strategy for Pennsylvania 4-H;
12. what are the effects of 4-H on the youth and adult participants;
13. what are the long term impacts of 4-H on society; and
14. what are the strengths and weaknesses of the evaluability assessment process?

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Agricultural Mechanics Laboratory Management Competencies

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INTRODUCTION

Agricultural mechanics is an important part of the total agricultural education program (Phipps, 1983). In many courses, the time allocated for instruction in mechanics comprises 25 to 40 percent of the total instructional time (Phipps, 1980).

Much of the agricultural mechanics instruction takes place in the mechanics laboratory. Therefore, efficient management of the mechanics laboratory is essential if optimal student learning is to occur (Bear and Hoerner, 1986).

According to Webster's New World Dictionary (Guralnik, 1984), management is defined as the ability to direct, conduct, or administer an activity. For the purpose of this investigation, laboratory management competencies were defined as those abilities needed by secondary agriculture teachers to direct, conduct, or administer an agricultural mechanics laboratory.

Review of Literature

The use of appropriate lab management techniques facilitates learning within an agricultural mechanics laboratory (Bear and Hoerner, 1986). The techniques one must apply to efficiently manage an agricultural mechanics laboratory are competencies. Agriculture instructors must possess agricultural mechanics laboratory management competencies if maximum laboratory learning is to occur (Henderson, 1983).

According to Shinn (1987), the agricultural mechanics laboratory must be safe and well organized if optimum student learning is to occur. Burke (1986) discussed several practices associated with efficient laboratory management. Burke listed the regulation of environmental factors, storage of tools, and control of consumable supplies as areas which are important for efficient management of the agricultural mechanics laboratory.

Managing an agricultural mechanics laboratory is a difficult task. Paulter (1971) stated that teachers of laboratory subjects require more organizational and management abilities than do classroom teachers. Barrick and Powell (1986) indicated that first-year agriculture teachers rated the ability to manage laboratory learning as a highly important ability for agriculture teachers. The first-year agriculture teachers also felt that their level of knowledge concerning the management of laboratory learning was lower than 13 of 26 teacher abilities studied.

Agricultural mechanics is a highly visible part of the total agricultural education program. The quality of the agricultural mechanics activities, including agricultural laboratory management, affects the image of the local program. Jewell (1987) found that housekeeping of the classroom and shop was the area which North Carolina administrators most frequently cited as being deficient in the performance of agriculture teachers. Foster and Reinsenberg (1985) found that high school administrators in Idaho rated shop safety, shop discipline, and shop organization as above average indicators of overall program quality.

Polson (1985) determined the technical agricultural mechanics competencies needed by agriculture teachers. However, a computerized search of the literature supplemented by a hand search of the literature failed to discover any research concerning the identification or validation of effective agricultural mechanics laboratory management competencies.

The review of literature indicated the importance of the efficient management of the agricultural mechanics laboratory. However, the researchers were unable to clearly identify, through the review of the literature, agricultural mechanics laboratory management competencies which best facilitate the learning process. Therefore, the identification and evaluation of these competencies became the focal point for the investigation.

PURPOSE AND OBJECTIVES

The purpose of this investigation was to determine the laboratory management competencies needed by secondary agriculture instructors. Specific objectives for the investigation were:

(1) To identify the agricultural mechanics laboratory management competencies essential for effective laboratory instruction.

(2) To determine the perceptions of agricultural mechanics specialists toward the identified laboratory management competencies.

PROCEDURES

The identified experts for this study were all postsecondary, college, and university agricultural mechanics specialists serving on the National FFA Agricultural Mechanics Contest Committee during the 1986-87 school year (N=92).

A modified Delphi technique was selected as the research method for this investigation. According to Borg and Gall (1983, p. 413), the Delphi technique "can be used whenever a consensus is needed from persons who are knowledgeable about a particular subject ... it can be used to identify problems, define needs, establish priorities, and identify and evaluate solutions." One assumption inherent in this study was that the agricultural mechanics specialists identified were knowledgeable about laboratory management competencies.

The researchers developed the "Agricultural Mechanics Laboratory Management Competencies Instrument." The instrument contained instructions directing each respondent to list twenty-five (25) agricultural mechanics laboratory management competencies which they felt were most important in order to effectively manage a secondary school agricultural mechanics laboratory.

The instrument and cover letter were mailed during July, 1987. Approximately two weeks later, a second identical instrument and a revised cover letter were mailed to those who had not yet responded. These mailings elicited a 43 percent response rate to the first round of the investigation. An additional follow-up letter was deemed unnecessary as competencies mentioned on later returns were essentially identical to those received earlier.

The researchers edited and combined the first round responses in a manner designed to preserve the integrity of the original responses. The resulting list of 50 competencies formed the basis for the "Assessment of Agricultural Mechanics Laboratory Management Competencies Instrument."

This instrument was designed to determine the importance of each identified competency. The instrument contained instructions directing the respondent to use a Likert-type scale of 1 to 5 to assess the importance of each competency. A response of 1 represented "no importance" and a response of 5 represented "utmost importance."

The instrument and a new cover letter were mailed to the agricultural mechanics specialists during August, 1987. A follow-up instrument and cover letter were mailed approximately two weeks later. These mailings resulted in a 76 percent response rate.

The researchers summarized the responses to the second round of the Delphi investigation by calculating group means and standard deviations for the 50 agricultural mechanics laboratory management competencies. A summary of the second round, a record of the individual's second round responses, a cover letter, and the third instrument were mailed to each agricultural mechanics specialist during late September, 1987. The cover letter instructed each participant to review the group mean and standard deviation for each competency, along with their own second round responses, prior to completing the third instrument. The third instrument also contained a section designed to elicit demographic information from the respondents. The initial third round mailing and the follow-up mailing during October, 1987, resulted in a 73 percent response rate.

ANALYSIS OF THE DATA

Since all of the agricultural mechanics specialists associated with the 1986-87 National FFA Agricultural Mechanics Contest were asked to respond, descriptive rather than inferential statistics were used to analyze the data. Means and standard deviations were computed for each of the agricultural mechanics laboratory management competencies. The demographic data were also analyzed using descriptive statistics. Cronbach's coefficient alpha for the "Assessment of Agricultural Mechanics Laboratory Management Competencies Instrument" was 0.94.

FINDINGS

According to Borg and Gall (1983) the participants in a Delphi study must be knowledgeable about the topic being investigated. Demographic information was collected and analyzed to provide additional verification of the respondents' knowledge and experience in the area of agricultural mechanics laboratory management.

The respondents reported a mean age of 45.97 years and an average of 20.43 years of teaching experience. Approximately 60 percent of the respondents' total instructional time was devoted to technical agricultural mechanics courses. Also, a majority of the respondents (71.7 percent) reported that they currently had the responsibility for managing one or more agricultural mechanics laboratories. All of the respondents held at least one college degree. The highest degrees held were: the Bachelors (1.75 percent); the Masters (17.54 percent); and the Doctorate (80.70 percent).

Forty-four of the 50 identified laboratory management competencies were perceived by agricultural mechanics specialists as being of average or greater importance as indicated by a group mean score of 3.0 or higher (1 = No Importance, 3 = Average Importance, 5 = Utmost Importance). All 50 competencies received a mean score (MS) of 2.51 or greater. All competencies identified had a standard deviation (SD) of 1.02 or less (Table 1) .

Six of the laboratory management competencies received a mean score of 4.5 or greater. These competencies were: document safety instruction (MS = 4.75, SD = .50), store hazardous materials safely (MS = 4.64, SD = .57), update course offerings (MS = 4.60, SD = .63), safely arrange shop equipment (MS = 4.55, SD = .61), conduct safety inspections (MS = 4.54, SD = .75), and select and maintain protective equipment (MS = 4.51, SD = .70).

A total of six of the laboratory management competencies received an overall mean score of less than 3.00. These competencies were: make minor facility repairs (MS = 2.51, SD = .98), make major equipment repairs (MS = 2.69, SD = 1.02), install major equipment (MS = 2.84, SD = .86), computerize laboratory management functions (MS = 2.91, SD = .97), computerize student records (MS = 2.96, SD = 1.02), and construct welding booths, etc. (MS = 2.99, SD = .91).

Insert Table 1 here.

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

One assumption inherent in utilizing the Delphi technique is that the respondents must be knowledgeable about the subject matter under study. Based on an analysis of the demographic data reported by the respondents, the researchers felt that this assumption was met.

The competencies identified by the respondents represent their perceptions of competencies which are essential for effective management of the agricultural mechanics laboratory. Eighty-eight percent of the competencies identified were of above average importance to the agricultural mechanics specialists. All of the competencies identified had mean scores higher than 2.50 on a 1 to 5 importance scale. The standard deviation of each mean score reported was less than one for all but three competencies. This indicates a moderately high level of agreement among the respondents as to the importance of the identified competencies. Therefore, the identified competencies represent the skills necessary for effective laboratory management as perceived by the agricultural mechanics specialists.

The agricultural mechanics specialists perceived the provision and documentation of safety instruction as the most important competency that a secondary agriculture teacher must possess in order to effectively manage an agricultural mechanics laboratory. Eleven of the top 18 competencies identified by the respondents were safety related. This emphasis on safety indicated that the agricultural mechanics specialists feel safety related competencies are very important to the successful management of the agricultural mechanics laboratory.

The respondents indicated that equipment installation, equipment repair, and facility repair were the least important laboratory management competencies identified. The authors interpreted this finding to mean that although the respondents perceived these competencies to be important, the respondents felt that the instructors' time would be better spent on other laboratory management competencies. The agricultural mechanics specialists identified "update course offerings," "develop objective student evaluation criteria," "identify current references and technical manuals," "document student competencies," and "develop educational projects and activities" as important competencies for successful agricultural mechanics laboratory management. The mean for each of these competencies was 3.99 or greater (Table 1). Although these competencies are not unique to laboratory management, the agricultural mechanics specialists recognized the importance of following sound educational practices when managing the laboratory for maximum student learning.

The identified competencies represent the perceptions of recognized experts concerning the skills needed by high school agriculture teachers as they manage an agricultural mechanics laboratory. Teacher educators should provide present and prospective agriculture teachers with experiences designed to develop and enhance these skills.

Further research should be conducted to determine how important the identified agricultural mechanics laboratory management competencies are to secondary agriculture teachers and school administrators. Also, research is needed to determine the extent to which agriculture teachers possess and practice these laboratory management competencies.

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Table 1. Laboratory management competencies identified by the agricultural mechanic specialists (N=67)

Order	Competency	Mean	Standard deviation
	How important is it that a secondary agriculture teacher:		
1	Provide and document safety instruction	4.75	0.50
2	Store hazardous materials safely	4.64	0.57
3	Update course offerings	4.60	0.63
4	Safely arrange shop equipment	4.55	0.61
5	Conduct safety inspections	4.54	0.75
6	Select and maintain protective equipment	4.51	0.70
7	Maintain/install safety devices	4.44	0.91
8	Develop objective student evaluation criteria	4.30	0.65
8	Develop lab cleanup procedures	4.30	0.85
8	Develop and enforce a student discipline policy	4.30	0.95
11	Comply with OSHA standards in the laboratory	4.29	0.76
12	Maintain healthy environmental conditions	4.27	0.67
12	Identify equipment needed to teach mechanical skills	4.27	0.73
14	Identify current references and technical manuals	4.22	0.60
15	Operate within the limits of a budget	4.21	0.84
15	Color code laboratory	4.21	0.86
15	Develop an accident reporting system	4.21	0.90
18	Document student competencies	4.16	0.67
18	Diagnose malfunctioning lab equipment	4.16	0.81
20	Equip work stations for skill areas	4.13	0.72
20	Develop lab policy	4.13	0.83
22	Maintain consumable supply inventory	4.06	0.65
22	Develop/maintain a file of equipment operator manuals	4.06	0.74
22	Arrange for professional assistance for major repairs	4.06	0.78
25	Recognize quality tools and equipment	4.04	0.73
25	Inventory tools and equipment	4.04	0.77
25	Make minor equipment repairs	4.04	0.79
28	Develop a rotational shop plan	4.03	0.83
29	Perform routine maintenance	4.00	0.89
30	Develop educational projects and activities	3.99	0.88
31	Administer first aid	3.94	0.99
32	Develop procedures to store, secure, and check out tools and equipment	3.93	0.74
33	Prepare bid specifications	3.90	0.82
34	Store and distribute student supplies	3.87	0.74
34	Brand or mark tools to prevent theft	3.87	0.83
36	Develop equipment maintenance schedule	3.82	0.78
37	Maintain file of educational projects	3.81	0.68

Table 1. (continued)

Order	Competency	Mean	Standard deviation
How important is it that a secondary agriculture teacher:			
38	Utilize technical manuals to order replacement parts	3.78	0.71
39	Plan and implement student recruitment	3.66	0.79
40	Estimate time requirements for students to complete their projects	3.61	0.82
41	Plan a public relations program	3.52	0.82
42	Develop student billing procedures	3.31	0.96
43	Silhouette tool cabinets	3.16	1.01
44	Modify the facility for handicapped students	3.12	0.79
45	Construct welding booths, etc.	2.99	0.91
46	Computerize student records	2.96	1.02
47	Computerize lab management functions	2.91	0.97
48	Install major equipment	2.84	0.86
49	Make major equipment repairs	2.69	1.02
50	Make minor facility repairs	2.51	0.98

Agricultural Mechanics Laboratory Management Competencies
A Critique

Jack L. Rudolph, Jr., University of Wyoming--Discussant

This study is very timely, especially considering the changes on the horizon for agriculture education. The reasoning for the study was well done and brought forward very pointedly by the citing of the Foster and Reinsenberg study, in which administrators consider shop organization an above average indicator of program quality.

The purpose (No. 1) to identify the agricultural mechanics laboratory management competencies and (No. 2) to determine a rank of importance for each competency, were clear and understandable for the reader. The use of the National FFA Agricultural Mechanics Contest Committee was an excellent decision. The Delphi technique was an appropriate choice for analysis of the data.

The researchers indicated little or no information was available concerning validation of laboratory management competencies. I would concur with that finding but there is considerable information on facility needs and requirements. It would have been advantageous for the researchers to develop a preliminary instrument based on facility requirements. This document could have been included in the first mailing and the respondents directed to make additions or deletions as they felt necessary. The number of respondents would have almost certainly increased from 43 percent. Included on the instrument, competency 41 states: "Plan a public relations program." I contend that if the management techniques of this study are implemented, a public relations program will be in progress.

The researchers are to be commended for their efforts and I look forward to the follow-up study.

COGNITIVE LEVEL OF INSTRUCTION AND STUDENT PERFORMANCE AMONG SELECTED OHIO PRODUCTION AGRICULTURE PROGRAMS

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INTRODUCTION

Three-quarters of a century of educational literature (Stevens, 1912; Ryan, 1973; Chamberlain & Kelly, 1981; Furst, 1981) suggests that the main emphasis in schools has been teaching students facts, even though teachers and curriculum designers have attested to the importance of teaching students to think (Gall, 1970; Roberts, 1974). Newcomb and Trefz (1987) in study of college professors of agriculture, stated that professors of agriculture concerned themselves with the subject matter their students learned, but that these same professors were less concerned about the cognitive level of their instruction. Also, the professors of agriculture, were less concerned about the cognitive level of student performance (Newcomb & Trefz, 1987).

The authors of this study were concerned that not only teachers of agriculture at the college level, but teachers of agriculture at all educational levels practice the pattern of teaching suggested by Newcomb and Trefz (1987). If students are limited to repeating back to the teacher that which was given to them, then not much instruction of an enduring nature has occurred. And, if insufficient instruction occurs at the higher levels of cognition, then students are not graduated adept to a higher order cognitively, viz. analysis, synthesis, and evaluation (Newcomb & Trefz, 1987).

The teachers' lack of concern identified by Newcomb and Trefz (1987) regarding the cognitive level of instruction and student performance may not only lead to a lowered teaching standard, but may well lead to a lowered level of competence on the students' behalf. Given the preceding presumption, of utmost importance is to question whether or not agricultural educators know at what level of cognition instruction is being delivered, and at what level of cognition the students are performing.

Inferentially, the related research cannot be applied to agricultural education programs specifically because the populations studied have not included vocational agriculture students. Furthermore, the researchers of previous related studies have not acknowledged any differences or similarities among vocational agriculture students and the populations studied. As a result, agricultural educators do not know to what level of cognition of instruction students in production agriculture classrooms are exposed, or to what level of cognition the students are capable of performing.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the cognitive level of classroom instruction being utilized by selected public school production agriculture teachers. Furthermore, this study sought to determine the level of cognition at which students in production agriculture classes were performing.

The following research questions were investigated:

1. What proportion of time was devoted to instruction in the subject matter areas (leadership, crop production, animal science, agricultural mechanics, and farm management) by the selected production agriculture teachers during the 1987-1988 academic year?

2. What was the cognitive level of instruction (remembering, processing, creating, evaluating) utilized by the selected production agriculture teachers during the 1987-1988 academic year?

3. To what extent did the cognitive level of instruction differ among the grade levels (ninth, tenth, eleventh, and twelfth) and subject areas?

4. What was the level of achievement of the students in the study on a written paper-pencil test at the various levels of cognition?

PROCEDURES

Population and Sample

The population for this study was the production agriculture teachers teaching in Ohio during 1987-1988. Ten teachers were purposefully selected to participate in this study based upon predetermined criteria. The twelfth-grade students enrolled in production agriculture classes in Ohio were the population of students for this study. The twelfth-grade students of the teachers selected for this study constituted the sample of students. The results are generalizable only the sample.

Design of the Study

This was a descriptive study.

Instrumentation

The course of study prepared by each production agriculture teacher in the study was used to determine the level of cognition of instruction and the proportion of time devoted to instruction in each of the subject areas.

A paper-pencil test was developed by the researcher which was administered to the twelfth-grade students enrolled in vocational agriculture programs taught by the selected production agriculture teachers. The paper-pencil test was constructed after analyzing the courses of study to ensure that the paper-pencil test questions were related to the subject matter which had been included in the students instruction.

The paper-pencil test had four parts: remembering, processing, creating, and evaluating. Each part consisted of 25 multiple choice questions. Content validity was established by a panel of experts. Reliability was established for each part of the test via pilot test. The reliability scores employing Cronbach's alpha, which is equivalent to Kuder-Richardson 20 by coding the data as dichotomous (SPSS^{x} User's Guide, 1986) were: remembering, .91; processing, .90; creating, .84; and evaluating, .82.

Data Collection

The teachers selected for this study were asked to personally deliver or mail their courses of study to the researchers. After receipt of the courses of study, they were carefully reviewed page by page by one of the researchers. Each instructional objective written in each course of study was classified into the appropriate level of cognition developed by Newcomb and Trefz (1987). In addition, the instructional objectives were categorized into the appropriate subject matter area and the number of class days allotted for the instruction was recorded.

The paper-pencil test and test administration form were mailed to each of the teachers with specific instructions for administration. All tests were administered on May 23 and 24, 1988. After administration of the tests, the teachers returned the tests and test administration form to the researchers by return mail.

DATA ANALYSIS

Descriptive statistics (frequencies, percents, standard deviations, and means) were used to describe the proportion of time spent on instruction in the subject matter areas, the level of cognition of instruction, and student level of cognitive performance. Differences between grade levels and subject areas were determined by using one-way analysis of variance using an .05 alpha level (a priori). In those cases where significant differences were found, the Tukey-HSD post-hoc analysis procedure was employed to determine where the differences occurred.

RESULTS

Subject Matter Taught

Table 1 shows that the production agriculture teachers devoted approximately 9% of the instructional time to leadership, 16% to crop production, 18% to animal science, 41% to agricultural mechanics, and 17% to farm management.

Cognitive Level of Instruction

Data were collected related to the level of cognition of instruction by subject area and grade level as indicated by the teachers' courses of study. These data are presented in Tables 2 through 4.

Table 2 indicates that 31% of the instructional objectives were written at the remembering level. Approximately 38% of the instructional objectives were written at the processing level, 19% at the creating level, and 12% at the evaluating level.

Table 3 shows that approximately 16% of the instructional objectives were written in the subject areas of leadership, 19% crop production, 18% animal science, 30% agricultural mechanics, and 17% farm management.

Table 1

Number and Percent of Instructional Days Devoted to Instruction by Subject Area and Grade Level (n=10)

	Grade Level									
	9		10		11		12		Total*	
Subject Area	Days[a]	%[a]	Days[a]	%[a]	Days[a]	%[a]	Days[a]	%[a]	Days[a]	%[a]
Leadership	26.20	14.55	15.80	8.78	8.80	4.89	13.30	7.39	64.10	8.90
	9.60	5.26	3.12	4.48	7.88	4.43	9.53	5.15	25.68	3.47
Crop	28.70	15.94	32.80	18.22	24.50	13.61	27.50	15.28	113.50	15.76
Production	13.83	7.67	24.46	14.00	16.57	9.20	19.18	10.55	26.81	3.73
Animal	54.20	30.11	35.40	19.67	24.40	13.56	15.00	8.33	129.00	17.93
Science	11.54	6.20	17.04	9.35	19.30	11.80	10.54	5.87	39.00	5.41
Agriculture	52.00	28.89	78.60	43.66	96.50	53.61	66.00	36.67	293.10	40.71
Mechanics	13.99	7.77	18.76	10.31	33.67	18.64	26.12	14.48	46.09	6.31
Farm	18.90	10.51	17.40	9.67	25.80	14.33	58.20	32.33	120.30	16.71
Management	12.66	7.02	15.59	8.60	21.72	11.98	29.94	16.47	34.39	4.81

*State recommendations are: Leadership, 5%, Crop Production, 25%; Animal Science, 25%; Agricultural Mechanics, 30%; Farm Management, 15%.

[a] Data reported are: Mean
Standard Deviation

Table 2

Distribution of Instructional Objectives Across Levels of Cognition

Level of Cognition	Number of Objectives	Percent of Objectives
Remembering	1045	31.00
Processing	1293	38.36
Creating	626	18.57
Evaluating	407	12.07
Total	3371	100.00

Table 3

Number and Percent of Instructional Objectives Across Levels of Cognition by Subject Area (n=10)

	Level of Cognition									
	R		P		C		E		Total	
	No.[a]	%[a]	No.[a]	%[a]	No.[a]	%[a]	No.[a]	%[a]	No.[a]	%[a]
Leadership	18.70	33.63	21.00	37.77	11.40	20.50	4.50	7.26	55.60	16.49
	6.85	8.77	8.63	8.74	8.77	12.27	4.25	6.33	19.43	5.34
Crop Production	21.80	33.38	26.70	41.14	9.90	15.25	6.50	10.02	64.90	19.25
	15.35	15.27	10.55	7.25	6.19	9.83	4.03	6.11	26.09	3.53
Animal Science	18.40	31.13	24.40	41.29	8.60	15.55	7.70	13.03	59.10	17.53
	11.75	13.63	11.25	6.77	5.74	10.25	4.24	7.57	24.70	2.92
Agriculture Mechanics	29.70	29.67	34.60	34.57	20.80	20.78	15.00	14.98	100.10	29.69
	15.73	13.18	16.47	11.64	13.12	14.12	8.30	6.54	40.36	7.02
Farm Management	15.90	27.71	22.60	39.37	11.90	20.73	7.00	12.10	57.40	17.03
	7.74	18.16	10.00	13.65	9.58	11.13	2.75	3.59	20.35	3.46

Note: R=Remembering, P=Processing, C=Creating, E=Evaluating
[a]Data reported are: Mean
Standard Deviation

The majority (68% to 72%) of the instructional objectives written in the courses of study by the production agriculture teachers at all grade levels were written at the lower (remembering and processing) levels of cognition (Table 4).

Student Performance

The mean score of correctly answered questions at each level of cognition was approximately 64% percent of the remembering level questions, 55% of the processing level questions, 40% of the creating level questions, and 28% of the evaluating level questions (Table 5).

Differences in Levels of Cognition of Instruction by Grade Level and Subject Area

Table 6 indicates that two out of the five subject areas at the remembering level of cognition (Table 6) were found to have significant differences by grade level. At the cognitive level of processing, four of the five subject areas had significant differences. Only one subject area was found to have significant difference at the creating and evaluating level of cognition.

Table 4

Percentages of Instructional Objectives Across Levels of Cognition by Grade Level

	Level of Cognition			
Grade Level	Remembering %	Processing %	Creating %	Evaluating %
9	33.00	39.02	18.28	9.70
10	30.29	38.48	17.31	13.92
11	28.87	38.87	19.75	12.51
12	31.18	37.18	18.88	12.07
Total	31.00	38.36	18.57	12.07

Table 5
Distribution of Student Mean Scores Across Level of Cognition (n=81)

Level of Cognition	Mean Score (% Correct)
Remembering	63.91
Processing	55.41
Creating	40.02
Evaluating	28.20

CONCLUSIONS AND/OR RECOMMENDATIONS

Conclusions

1. The production agriculture teachers are devoting a greater percentage of time to some subject matter areas than is recommended and conversely spending less time in other areas than is recommended.

2. Teachers of agriculture are writing more instructional objectives at higher cognitive levels than suggested (Gall, 1970; Kirts & Stewart, 1983) by the literature.

3. The students performed better at higher levels of cognition than previous studies (Gall, 1970; Ryan, 1973) had suggested.

Table 6

Analysis of Variance of Percentages of Instructional Objectives for the Level of Cognition by Grade Level (n=10; df 3, 36)

	Mean* Score by Grade Level					
Level of Cognition	9	10	11	12	F Value	Probability
Remembering						
Leadership	25.11^{a}	26.44^{a}	23.34^{a}	17.72^{a}	.49	.69
Crop Production	23.28^{a}	20.77^{a}	15.52^{a}	16.24^{a}	.83	.49
Animal Science	19.39^{a}	20.72^{a}	10.68^{a}	10.84^{a}	3.12	.06
Ag Mechanics	18.42^{a}	23.89^{a}	41.38^{b}	25.05^{b}	4.68	.01
Farm Management	13.80^{a}	8.18^{a}	9.07^{a}	32.15^{b}	6.54	.01
Processing						
Leadership	20.59^{a}	15.09^{a}	14.16^{a}	13.15^{a}	1.42	.25
Crop Production	24.95^{ab}	30.01^{a}	14.20^{b}	11.54^{b}	8.61	.01
Animal Science	25.58^{a}	19.03^{ab}	17.60^{ab}	8.50^{b}	4.75	.01
Ag Mechanics	15.73^{a}	21.73^{ab}	40.09^{b}	28.78^{ab}	4.63	.01
Farm Management	13.16^{a}	14.14^{a}	13.95^{a}	38.12^{b}	9.08	.01
Creating						
Leadership	25.82^{a}	16.84^{a}	10.47^{a}	13.56^{a}	2.34	.09
Crop Production	17.11^{a}	15.38^{a}	17.82^{a}	16.35^{a}	.05	.98
Animal Science	15.61^{ab}	9.54^{ab}	21.84^{b}	8.59^{a}	3.59	.02
Ag Mechanics	3.30^{a}	6.10^{a}	6.20^{a}	5.20^{a}	.88	.47
Farm Management	17.43^{a}	24.79^{a}	11.76^{a}	28.70^{a}	1.62	.20
Evaluating						
Leadership	15.58^{a}	7.86^{a}	9.43^{a}	7.29^{a}	1.09	.37
Crop Production	15.38^{a}	16.09^{a}	19.44^{a}	13.43^{a}	.37	.77
Animal Science	23.82^{a}	21.55^{a}	17.72^{a}	10.84^{a}	1.69	.19
Ag Mechanics	26.79^{a}	41.51^{a}	43.30^{a}	34.77^{a}	1.45	.25
Farm Management	18.43^{ab}	12.99^{a}	10.11^{a}	33.67^{b}	4.72	.01

*Means with the same superscript do not differ significantly when alpha = .05 utilizing the Tukey-HSD post-hoc analysis procedure.

4. As grade level increases, the teachers of agriculture are raising the cognitive level of the instructional objectives in some subject areas. The results of this objective are in contrast to the findings of Billeh (1974).

Recommendations

1. Teachers of agriculture in the public schools should assess the level of cognition of instruction being delivered to their students and if found to be unacceptable by some predetermined standard, corrective action should be taken

to develop a curriculum which appropriately challenges the students at all levels of cognition.

2. Sensitize the pre-service teachers to the level of cognitive development by having the teacher educators include a unit of instruction on recognizing and writing instructional objectives at the various levels of cognition.

3. As students progress to higher grade levels, the teachers of agriculture should make a concerted effort to elevate the cognitive level of instruction.

4. The teachers of agriculture should purposefully create learning situations which would assist in the development of higher cognitive abilities in students.

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Cognitive Level of Instruction and Student Performance Among Selected Ohio Production Agriculture Programs
A Critique

J. Dale Oliver, Virginia Tech--Discussant

This study addresses a major area of concern, especially in view of the changes taking place in agricultural education. The authors have provided a conceptual framework for the study and have developed valid and reliable instruments. The conclusions and recommendations appear to be clearly related to the findings of the study.

The major concern I have with the study is the lack of information on the sample. There is no indication of why 10 teachers were selected and the predetermined criteria used in their selection were not indicated. Based on the information provided, it would not be possible for an experienced researcher to replicate the study.

Another concern relates to the statement, "The results are generalizable only to the sample." I assume this means the results are applicable only to the sample since I think of generalization involving making inferences about a population based on a representative sample. The authors used a one-way analysis of variance in the data analysis and, if the results are only applicable to the sample, what is the basis for using an inferential statistical technique? A minor concern is that research question one dealing with the proportion of time devoted to instruction in the subject-matter areas is not clearly related to the purpose of the study.

I commend the researchers for exploring a new area of inquiry in agricultural education and encourage them to continue this work.

CRITICAL THINKING SKILLS OF AGRICULTURE STUDENTS

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INTRODUCTION

Agricultural educators are constantly facing a growing body of complex information and knowledge. It is becoming apparent that the sheer amount of information needed by agriculture students to function in today's society is overwhelming. This "knowledge explosion" is growing so rapidly that many individuals risk becoming professionally obsolete unless they continually learn and update themselves. The high rate of technological change that is associated with our information society demands that students possess the ability to process increasing amounts of complex information and knowledge in practical and systematic ways.

John Dewey's (1933) philosophical effort to define thinking--reflective thinking--was aimed toward improving an individual's thinking process to "change his own personal ways until they become more effective; until...they do better the work that thinking can do and that other mental operations cannot do so well" (p. 3). Dewey also recognized the problem solving aspects of thinking in the second of his five phases of reflective thought.

Robert H. Ennis (1962) concluded that efforts to teach critical thinking had been deficient due to the fact that no one had attempted a comprehensive, detailed examination of what was involved in making judgments about the worth of statements or answers to problems. Although Ennis essentially supported Dewey's proposition of thinking, he felt that it provided only a psychological and not a logical criterion for the solution of the problem. In other words, the problem was solved when the thinker thought it was solved.

Ennis (1985) believed that higher-order thinking skills were also incorporated in his definition of critical thinking because "deciding what to believe or do is a higher-order thinking enterprise, and most practical higher-order thinking activity is focused on deciding what to believe or do" (p. 47). The working definition of critical thinking by Ennis (1985) evolved into "reflective and reasonable thinking that is focused on deciding what to believe or do" (p. 45) and, as defined, involves dispositions, abilities, and is a practical activity.

Recognition of the importance of cognitive functioning--intelligent thinking and intellectual processes--to individual competence in education, the community, and the workplace has come to the forefront as a growing concern at all educational levels. There are diverse and numerous terms which describe these thinking and cognitive processes: higher order thinking, critical thinking, problem solving, decision making and practical reasoning. Sternberg (Quinby, 1985) indicated that in spite of the terminology used to describe these processes, people are saying the same thing using different words.

Over forty years ago in Permanent Learning, Lancelot (1929) described a person's knowledge and thinking ability as being of crucial importance for human efficiency and success in the then present age of science and technology. He attributed the success of solving problems encountered in life every day to a "general thinking ability."

There are many models of thinking that have been successfully implemented and effectively utilized in classroom settings to teach students how to think and learn best. Research has shown that thinking strategies are most effective when taught in conjunction with the appropriate subject matter content. By teaching students how to think and learn independently, we increase their power to think and learn outside of the classroom. It is vital that knowledge and thinking skills become tools that can be used by students for the preservation and advancement of agricultural knowledge by present and future generations of this society.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the ability of agriculture students in Iowa to use critical thinking skills.

The specific objectives of this study were to:

1. Assess the critical thinking abilities of agriculture students in Iowa as measured by a standardized test of critical thinking.
2. Compare the critical thinking abilities of agriculture students in Iowa to established critical thinking values.
3. Analyze selected relationships associated with levels of critical thinking.

PROCEDURES

The population of interest in this study consisted of agriculture students enrolled in 262 agriculture programs in Iowa. The total enrollment of Iowa agriculture students in grades 9-12 was determined to be 10,603.

Cluster sampling was used because it was not possible to obtain a list of all members of the population. The population was divided into non-overlapping groups of elements, in this case schools. Schaeffer et al. (1986) stated that "if these groups are considered to be clusters, then sampled groups are then subsampled..." (p. 234)

It was determined from Oliver et al. (1983, 1985) that the minimum sample size should be 325 respondents. Upon recommendation by the Statistical Laboratory and the Statistics Department at Iowa State University, this sample size was increased by 50 percent to assure that the cluster sample adequately represented the population. A new minimum sample of 437 respondents was determined to be necessary.

The number of schools needed to generate the minimum sample was based upon the state-wide average number of students in each program. Using a computer-generated table of random numbers, 25 schools were initially selected for sampling. Telephone interviews were conducted to ascertain teachers' interest in cooperating in this study and to estimate the number of unduplicated 9th, 10th, 11th, and 12th grade students enrolled in their agriculture courses. Eighteen schools were selected for inclusion in this study and one of the instructors served two schools. The goal of 437 respondents established as the baseline sample was exceeded. A total of 18 schools and 668 students participated in the study. The final sample represented approximately six percent of all high school agriculture students in Iowa.

Upon a review of literature and available tests, the Cornell Critical Thinking Test Level X^R (Ennis and Millman, 1985) was selected to collect the data. It is a 71-item, multiple-choice, normed test intended to be taken in a 50 minute period. Each item has three choices and one keyed answer. Level X was designed primarily for evaluation and is aimed at fourth-through fourteenth-graders. Scores were normed using suburban high school students.

Agriculture instructors in each of the randomly-selected high schools were sent a letter requesting their participation and cooperation in the research study. A package of school-coded test materials was forwarded to each of the 18 different schools participating in the study. All agriculture students were administered the Cornell Critical Thinking Test Level X^R during the prescribed 50 minute period of time. Instructors recorded information from the individual student's cumulative folders to Student Data Sheets. If a respondent failed to provide sufficient information, a follow-up telephone call was made to ascertain the appropriate information.

ANALYSIS OF DATA

An identification number was assigned to each school and to each respondent to identify the participant by school and individual. Descriptive statistical procedures used for data analysis included frequencies, percentages, means, and standard deviations on all the items of the information and the student data sheets.

Inferential statistical analyses were performed using a variety of procedures. Tests for significant differences included group t-test and one-way analysis of variance. The Scheffe' post hoc test (.05) was used to determine where differences existed when a significant difference was found and more than two groups were being compared. Stepwise regression procedures were employed to predict student critical thinking scores.

RESULTS

Descriptive information about the respondents (N=668) is provided in Table l. The tenth grade class composed the largest percentage of respondents whereas the smallest percentage of respondents was from the twelfth grade class. Almost equal percentages of respondents were 15 or 16 years of age. The next largest age group was 17 years of age followed by 14-year-olds. The largest category of respondents had been enrolled in either one or two semesters of agriculture classes. The smallest category had been enrolled for seven semesters. Nearly two-thirds of the respondents had been in the FFA for one or two years. The remaining one-third had completed three or four years of FFA membership. Over half of the respondents had held one or two leadership positions while in high school and almost one-quarter more had held three or four leadership positions. Almost three-fourths of the respondents lived on farms.

Listed in Table 2 are the means, standard deviations, F-ratio, and F-probability for levels of critical thinking of the respondents grouped according to grade level. The mean score for all respondents was 36.89. The lowest level of critical thinking was observed for respondents in the tenth grade (mean = 34.51) and the highest level of critical thinking was observed for respon-dents in the twelfth grade (mean = 40.55). An analysis of variance test on these group means revealed that highly significant differences existed among group means. A Scheffe' post hoc test (.05) revealed differences among mean scores for grade 12 and all other grade level means.

Means, standard deviations, and percentile scores for respondents' levels of critical thinking compared to other high school students are presented in Table 3. Group XP was comprised of students randomly selected from a study hall in an upstate New York suburban school having a high proportion of college-bound students (Ennis and Millman, 1985). Group XQ was comprised of students completing a Biological Sciences Curriculum Study (BSCS) course of study (Ennis and Millman, 1985).

The respondents' mean (36.89) was observed to be the lowest among the three groups compared. The mean for Group XP was observed to be the highest (45.3), followed by the mean for Group XQ (40.6). Scores at the 99th percentile were approximately the same for all three groups. However, scores at the various percentile ranks for the respondents declined more rapidly when compared to the scores at various percentile ranks for the other two groups. The standard deviation (9.91) for the respondents was the largest among the comparison groups.

Table 1. Description of respondents

Variable	Percent	Number
Grade		
9	25.75	172
10	27.99	187
11	24.40	163
12	21.86	146
Total	100.00	668
Age		
4	15.53	98
15	26.78	169
16	28.53	180
17	20.13	127
18	9.03	57
Total[a]	100.00	631
Semesters of vocational agriculture		
1-2	40.24	268
3-4	27.03	180
5-6	21.32	142
7	11.41	76
Total[b]	100.00	666
Years in FFA		
1	36.38	231
2	28.19	179
3	21.26	135
4	14.17	90
Total[c]	100.00	635
High school leadership positions		
1-2	50.23	223
3-4	23.87	106
5-6	12.61	56
More than 7	13.29	59
Total[d]	100.00	444

Place of residence	Percent	Grade Level			
		9	10	11	12
Town	25.38	43	50	42	34
Farm	74.62	127	137	121	112
Total[e]	100.00	170	187	163	146

[a] Missing cases = 37.

[b] Missing cases = 2.

[c] Missing cases = 33.

[d] Missing cases = 224.

[e] Missing cases = 2.

Table 2. Critical thinking means, standard deviations, F-ratio, and F- probability by grade in school.

		Level of critical thinking			
Grade	N	Mean	S.D.	F-ratio	F-Probability
9	171	36.12	9.36	11.11	.000
10	187	34.51	10.13		
11	163	37.17	9.60		
12	146	40.55	9.60		
Total[a]	667	36.89	9.91		

[a] One missing case.

Table 3. Means, standard deviations, and percentile scores for levels of critical thinking compared to user norms[a]

Percentile rank	Iowa agriculture students	(XP) high school	(XQ) high school
99	56	57	56
95	52	54	52
85	47	51	49
75	44	50	46
65	42	49	44
50	37	46	41
35	32	44	38
25	29	41	36
15	25	38	32
5	20	32	26
1	15	23	21
Total	668	233	1673
Mean	36.89	45.3	40.6
Standard deviation	9.91	6.8	7.9

[a] User norms from Cornell Critical Thinking Tests Level X and Level Z Manual (3rd edition).

Table 4 reveals the highest critical thinking mean score (39.22) was observed for 17-year-olds followed closely by 18-year-olds (38.75). The next highest mean score was observed for 14-year-olds (37.26). All three groups scored above the mean (36.86) for the sample. An analysis of variance test revealed highly significant differences among group means. A Scheffe' post hoc test (.05) revealed differences in levels of critical thinking between the 15- and 17-year-old groups and the 16- and 17-year-old groups.

In Table 4, the highest mean critical thinking score (41.15) was observed for respondents who had completed six or seven semesters of agriculture classes. The lowest mean (35.54) was for respondents who had completed just one semester of agriculture classes. An analysis of variance test on the group means revealed that highly significant differences existed between the group means. A Scheffe' post hoc test (.05) revealed differences in levels of critical thinking between those students completing six to seven semesters and those completing one semester. Additionally, the mean for students completing six or seven semesters of agriculture was found to be different from the mean for students completing two to three semesters.

Table 4. Means, standard deviations, F-ratio, and F-probability for levels of critical thinking by selected variables.

	N	Mean	S.D.	F-ratio	F-Probability
Age					
14	98	37.26	9.21	5.03	.0005
15	168	35.05	9.84		
16	181	35.64	10.31		
17	161	39.22	9.40		
18	57	38.75	10.28		
Total	665[a]	36.86	9.93		
[a]Missing cases = 3.					
Semesters of Agriculture Completed					
1	246	35.54	9.50	8.96	.000
2-3	194	35.70	9.74		
4-5	140	38.18	10.06		
6-7	88	41.15	9.87		
Total	668	36.88	9.91		
Years of FFA Membership					
1	231	35.32	9.24	8.87	.0001
2	179	36.44	9.57		
3	136	37.37	10.37		
4	90	41.43	9.91		
Total	636[b]	36.94	9.86		
[b]Missing cases = 52.					
Leadership Positions					
1-2	223	35.90	9.40	13.9379	.0000
3-4	106	39.51	9.30		
5-6	56	41.73	9.50		
More than 7	59	43.44	9.00		
Total	444[a]	38.50	9.74		
[c]Missing cases = 224.					

The group in Table 4 with the highest critical thinking mean score (41.43) had four years of membership in the FFA. The lowest mean score (35.32) was observed for those respondents who had participated one year in FFA. An analysis of variance test on the group means revealed that highly significant differences existed between the group means. A Scheffe' post hoc test (.05) revealed differences among those students who had four years of FFA membership and those who had three, two, and one year of membership.

Table 4 also reveals the group of respondents who had held seven or more leadership positions had a mean critical thinking score of 43.44. The group with the lowest mean score (35.90) had held one or two high school leadership positions. An analysis of variance test on the group means indicated that highly significant differences existed among the group means. A Scheffe' post hoc test (.05) revealed differences in levels of critical thinking among the group of students who had held seven or more positions and each of the other three groups.

Data in Table 5 reveal that the highest mean (37.55) was observed for those respondents who lived on a farm, whereas those respondents who lived in town had a mean score (34.91) which was significantly lower at the .01 level.

Table 5. Test for differences in level of critical thinking of respondent living in town or on a farm

Place of Residence	N	Mean	S.D.	F-ratio	F-Probability
On a farm	97	37.55	9.79	3.02	0.003
In town	169	34.91	9.95		
Total	666[a]				

[a] Missing cases = 2.

Regression analysis was employed to identify variables which significantly influenced the predictability of critical thinking scores. Results of this analysis are presented in Table 6. Most notably, the first variable to enter the prediction equation was Use of Sources of Information, a subtest from the Iowa Tests of Educational Development. This variable accounted for 27.97 percent of the variance associated with critical thinking scores. Two other variables had significant F-ratios and entered the prediction equation in subsequent iterations. Cumulative grade point average (2.834%) and Literary Materials (1.695%), another subtest of the Iowa Tests of Educational Development which measures a student's perception of the moods and nonliteral meanings of literary materials, entered in steps two and three, respectively. After each significant predictor variable was entered, the full equation (with all significant variables entered) was able to account for 32.49 percent of the critical thinking score variance. Residual variance could not be attributed to the remaining variables on a statistical basis.

Table 6. Stepwise regression analysis of all variables excluding MBTI™ on critical thinking scores

Step	Variables entered	B[a]	Multiple r	F-ratio[b]
1	Use of sources of information (ITED subtest)	.333	.529	90.07
2	Cumulative grade point average	2.847	.555	51.41
3	Literary materials (ITED subtest)	.337	.570	36.90
	Constant = 22.43	Multiple $R^2 = .3249$		

[a] Regression coefficients for the final prediction equation.

[b] $F_{1,233,.05} = 3.81$.

CONCLUSIONS

Based on the findings of this investigation, the following major conclusions were drawn.

Given the basic tenets of agricultural education, its problem-solving approach to instruction, and the evidence provided in this investigation, one can conclude that agriculture students in Iowa are developing critical thinking skills but at lower levels than the suburban students in the normed groups.

The level of critical thinking of a secondary agriculture student in Iowa is related to their level of academic and educational achievement. As a result of low levels of critical thinking observed in the sample of Iowa secondary agriculture students, agricultural educators must incorporate principles of critical thinking and problem-solving into their curriculum if scores are to be improved.

The authors of the Cornell Critical Thinking Test alluded to the important qualification that students were able to read well. The results of the regression analyses may verify the authors' inference that a student's reading comprehension is a strong indicator of their level of critical thinking ability as measured by this test.

Psychomotor activity and skill development is affected and determined by the cognitive activity inherent in critical thinking. Development of critical thinking activities beyond "deciding what to believe and do" is essential for agricultural education.

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Critical Thinking Skills of Agriculture Students
A Critique

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This study examined an important aspect of the educational development of students; that of the ability to think critically and to solve problems. The researchers provided a thorough rationale for studying the critical thinking skills of agriculture students and presented their study objectives clearly and succinctly. The researchers were thorough in organizing and implementing their sampling procedures in order to ensure that the data collected were representative of the population. In using cluster sampling they were careful to use both randomly selected clusters and a large enough sample to ensure representation of the population. Both the data collection procedure and statistical analysis were proper for the study. For the most part the conclusions were well supported by the data and findings. The researchers were cautious not to make conclusions that went beyond the data. In this type study it is sometimes easy to draw conclusions that are not warranted by the data. The following are suggestions for the study:

1. Is it appropriate to compare achievement of Iowa agriculture students to that of a group of predominantly college bound students in upstate New York or a group of students completing a Biological Sciences Curriculum? Do these groups contain a normally distributed population of students? For example, is it possible that the XP and XQ groups were composed of mostly 11th and 12th grade students? Did not the two "norm" groups contain a high percent of college bound students? How does this compare with the Vo-Ag group consisting of mostly 9th and 10th graders who probably are not college bound? A comparison of achievement might be more meaningful if a less homogeneous group was used or if the two groups had more similarities.

2. The last conclusion, that psychomotor activity is affected and determined by cognitive activity inherent in critical thinking, seems to be outside the scope of the data collected in this study. Since this statement can be well documented in the literature, it might be more appropriate in the "need for the study" section or at least identified as a finding from the review of the literature.

3. What are the recommendations of the researchers? How is the study to be used? It would be helpful to know just how the researchers intended to use the study.

In summary, the study appears to be both procedurally and statistically sound.

FACTORS INFLUENCING THE DECLINE IN ENROLLMENT OF JUNIOR HIGH 4-H CLUB MEMBERS

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Introduction

The 4-H organization is one of the largest youth organizations in the world. 4-H clubs are made up of groups of young people between the ages of 9 and 19 in urban and rural areas. There are about five million boys and girls enrolled in 4-H in the United States and Puerto Rico. The basic objective of 4-H is to develop boys and girls into useful citizens.

The 4-H program in Lafourche Parish, Louisiana, has an annual enrollment of 2,300 or more 4-H club members. In 1985-86, there were 1,719 4-H club members in elementary schools, 288 in junior high schools, and 297 in senior high schools. The difference in enrollment between elementary schools and junior high schools is a major problem because of the loss of so many bright and capable members.

Research by Coop and Clark (1956) indicated that 60 to 65 percent of the dropouts could be prevented with more adequate knowledge and planning. The remaining 35 to 40 percent occurred for reasons beyond the immediate control of the 4-H organization such as reaching the age limit, moving out of the community, work conflicts, and the failure of the 4-H clubs to reorganize.

Shipley (1958), in reporting the results of case studies of 203 boys and girls who had remained in 4-H club work only one year, revealed that when a member dropped out, it was usually because help and encouragement were not available when they needed it. "Progress toward better 4-H programs," she said, "was marked when agents realized that the program, not the member, had been inadequate" (p. 180).

Purpose and Objectives

The primary purpose of this study was to determine the reasons that former elementary and junior high 4-H club members did not re-enroll in junior high 4-H clubs. The specific objectives of this study were:

1. To determine the perceived influence of selected factors on the decision not to re-enroll as 4-H club members of former elementary and junior high Lafourche Parish 4-H club members.

2. To describe elementary and junior high 4-H club members in Lafourche Parish who did not re-enroll in 4-H on selected demographic characteristics.

3. To determine if relationships exist between influence of selected factors and selected personal characteristics.

Procedures

The population in this study was defined as all seventh, eighth, and ninth grade students in Lafourche Parish junior high schools in 1986-87 who were enrolled in 4-H club work in 1985-86 for two or more previous years and had dropped out of 4-H club work. Using Cochran's formula, the minimum sample size needed was determined to be 167. A simple random sample of 175 students was selected.

With minor modifications, the researchers were able to use an instrument developed in another study, "Factors Contributing to Non-reenrollment of 4-H Club Members in Southeast Florida" by Daniel Freas Culbert. The modified instrument consisted of three primary sections. Section 1 contained personal demographic information. Section 2 consisted of 48 possible reasons that may have influenced students to leave the 4-H organization. In this section, respondents were asked to indicate for each item whether or not it influenced their decision. Section 3 consisted of information regarding students' club activities.

To establish content validity of the modified instrument, it was reviewed by state 4-H agents, parish 4-H agents, 4-H leaders, and 4-H dropouts not included in the sample. The reliability of the 48-item scale in Culbert's study was assessed using the Cronbach's alpha procedure. The reliability coefficient was determined to be a = .92, indicating a high degree of internal consistency. Reliability of the 48-item scale in the current study was also assessed using Cronbach's alpha and was determined to be a = .85. The researchers administered the questionnaire to the randomly selected 4-H dropouts at a predetermined activity period. A follow-up session was set to administer the questionnaire to those who were absent at the first session. One hundred seventy-three of the 175 students to be surveyed responded.

Results

Perceived Influence for Leaving 4-H.

Reasons identified most and least frequently by respondents as influencing their decision not to reenroll in the 4-H program are presented in Table 1. Items are presented by frequencies of "yes" responses and rank.

The reason identified by respondents most frequently was "I had too much else to do" with 55% responding "yes" to this item. Other items reported by 40% or more of the responding students included: "I didn't like filling out project books" (94 or 54%); "4-H didn't change with me as I grew older" (74 or 43%); "Another group or club was more important to me (e.g., athletics, band, etc.)" (74 or 43%); and "The activities were always the same" (72 or 42%). In addition, the items least frequently noted by respondents were: "The club disbanded or broke up" (8 or 5%) and "The leader quit" (2 or 1%).

Table 1

Perceived Influence for Leaving 4-H

Reasons for Leaving 4-H	N*	%	Rank
I had too much else to do	96	55	1
I didn't like filling out project books	94	54	2
4-H didn't change with me as I grew older	74	43	3.5
Another group or club was more important to me	74	43	3.5
The activities were always the same	72	42	5
My friends didn't like 4-H	65	38	6
My friends left 4-H	64	37	7
I wasn't aware of what I could do in 4-H	57	33	8
4-H was not fun	56	32	9
Agriculture or home economics was not interesting to me	55	32	10
4-H was boring	53	31	11
4-H is for farm kids	15	9	40
The 4-H leader didn't like me	14	8	42
The leader lacked training or experience	14	8	42
I couldn't meet members of the opposite sex	14	8	42
I wasn't allowed to participate	13	8	44.5
The other members didn't like me	13	8	44.5
I was no longer eligible to belong to 4-H	11	6	46
The club disbanded or broke up	8	5	47
The leader quit	2	1	48

Note. *N* = 173
*Number of "Yes" Responses

Description of Respondents

Age. Age of respondents was one demographic characteristic studied. The average age of students in the study was 13.42 years. The largest group of respondents was 13 years of age (79 or 46%). An additional 55 (32%) were 14 years old. Twelve year olds made up 21 (12%) of the respondents, and 16 (9%) were 15 years old. The smallest age group represented was 16 with only 2 (1%) indicating that age.

Sex. There were 99 female students (57%) and 74 male students (43%) who took part in the study.

Age When First Joined 4-H. The average age of students surveyed when they first joined 4-H was 9.67 years. The largest group was 9 years of age (88 or 51%). An additional 59 (34%) were 10 years old while 21 (12%) were 11 years old and 5 (3%) were 12 years old.

Membership in Other Groups. Of the responses, 117 students (68%) said they belonged to one or more groups besides 4-H. There were 63 students (37%) indicating they belonged to two or three groups besides 4-H, while 56 students (32%) said they did not belong to any other group. In addition, 38 students (22%) and 16 students (9%) indicated that they belonged to one and four or more other groups respectively.

Highest Level of 4-H Presentation. The majority of those surveyed (105 or 61%) indicated they had never given a 4-H demonstration or public presentation anywhere. In addition, 68 students (39%) said they had given a presentation at some level. Frequency and percentage of respondents by their level of 4-H presentation are displayed in Table 2.

Highest Level of 4-H Leadership Position. When the students were asked what level of leadership position they had held in 4-H, 131 students (76%) said they had never been an officer or committee member, while 42 students (24%) said they were a committee member or an officer. Frequency and percentage of respondents by their level of 4-H leadership position held are presented in Table 3.

Leader. The questions "did your 4-H leader ever visit your home, take you to a parish, district, or state 4-H activity, and help you with your 4-H project" were asked. One hundred sixty students (92%) said their leader never visited their home, while 13 students (8%) said they did. There were 115 who said their leader did not take them to a parish, district, or state 4-H activity, while 58 (34%) indicated that their leader did take them. In addition, 87 (50%) said their leader didn't help them with their 4-H project, and 86 (50%) said their leader did help them with their 4-H project.

Agent. The same questions that were asked about leaders were asked about agents. Students' responses were 169 (98%) saying they never had an agent visit their home while 4 (2%) said their agent had visited their home. Of those surveyed, 155 students (90%) indicated their agent never took them to a parish, district, or state 4-H activity and 18 students

Table 2

Highest Level of 4-H Presentation

Presentation Level	N	%
Never gave a presentation	105	61
Presented at local club	28	16
Presented at parish level	37	21
Presented at district level	3	2
Presented at state level	0	0
Total	173	100

Table 3

Highest Level of 4-H Leadership Position

Leadership Level	N	%
Never an officer or committee member	131	76
Committee member at local level	23	13
Officer of committee chairperson of local 4-H club	18	10
Officer or committee chairperson of parish 4-H group	1	1
Officer or committee chairperson of district or state 4-H group	0	0
Total	173	100

(10%) said they had been taken by their agent to a 4-H activity. In addition, 128 students (74%) indicated they had never been helped by the agent with their 4-H project, while 45 (26%) said they had been helped.

Program Involvement. Members were asked if they had ever helped to plan a 4-H club meeting or program, traveled to another parish or state for 4-H activities, or gotten involved in a 4-H community service project. The majority, 123 (71%), indicated they had never helped to plan a 4-H club meeting or program while 50 (29%) said they had helped. Of those surveyed, 114 students (66%) indicated they had never traveled to another parish or state for 4-H activities, while 55 students (34%) said they did travel to another parish or state 4-H activity. Over three-quarters of the students (133 or 77%) said they hadn't been involved in a 4-H community service project, while 40 students (23%) said they had taken part in a 4-H community service project.

Relationships between influence of factors and selected characteristics.

The measuring instrument in this study consisted of 48 items. Calculation of correlations and differences between each of these items individually and the selected demographics would have been cumbersome to interpret as well as creating a high level of inflation of experimentwise error (alpha level). Therefore, the scale was factor analyzed to determine if underlying factors could be identified in the data.

Results of the factor analysis revealed ten factors in the data. These factors, as labeled by the researchers, and the percentage of variance explained are presented in Table 4. Previous research has shown certain variables to have an impact on members not re-enrolling in 4-H. These include age at first enrollment, participation in parish 4-H events, individual assistance received from extension agents, and activity in other clubs. Relationships between these variables and factors which explained approximately 5% or more of the variance are presented in this section.

Interest Factor Relationships. Of the demographics studied, member involvement was found to have the highest correlation. The demographic, member involvement, in this context is related to whether or not the member got involved in a community service activity. This item was positively related to the factor interest ($r = .16$, $p = .032$). This indicates that those respondents who said they never got involved in a community service activity tended to identify more of the items in the interest factor as influencing their decision not to re-enroll in 4-H.

Perceptions of Program Activities Factor Relationships. Of the demographics studied, agent involvement was found to have the highest correlation. The demographic, agent involvement, in this context is related to whether or not the 4-H agent ever helped the member with a project. This item was positively related to the factor perceptions of program activities ($r = .20$, $p = .007$). This indicates that those respondents who said their 4-H agent had never helped them with a project tended to identify more of the items in the perceptions of program activities factor as influencing their decision not to re-enroll in 4-H. The remaining demographics studied were found not to be significantly related to the perceptions of program activities factor.

Table 4

Factor Analysis

Factors	Rank	% of Variance
Interest	1	13.8
Perceptions of Program Activities	2	6.0
Personal Needs	3	4.8
Peer Relationships	4	4.1
Leader Activity	5	3.9
Program Demands	6	3.7
Program Deficiencies	7	3.5
Club Meetings	8	3.4
Other Organizations	9	3.1
Break Up	10	2.8

Personal Needs Factor Relationships. No significant relationships were found between the factor personal needs and the demographic variables studied.

Conclusions and Recommendations

The following conclusions were derived and recommendations formed based on the findings of this study.

1. The majority of the respondents who left the 4-H program felt that they had too much else to do.

This conclusion is similar to the findings of Culbert's (1983) study which said having too much to do was one of the most frequently given reasons for leaving 4-H.

The researchers would recommend further research be done to determine what specific activities were conflicting with students' involvement in the 4-H organization.

2. Most of the respondents never gave a demonstration or public presentation in 4-H.

The researchers would recommend further research be done to find out why those respondents hadn't given a demonstration or public presentation in 4-H.

3. The majority of former 4-H members never were officers or committee members in 4-H.

The researchers would recommend that 4-H clubs expand their committee structures to involve more individuals. The researchers would further recommend developing leader instructional materials on setting up and using committees in local 4-H clubs.

4. The majority of students surveyed indicated that their 4-H leader and agent never visited their home, took them to a parish, district, or state 4-H activity, or helped them with their 4-H project.

The researchers would recommend that both leaders and agents make a special effort to work with more of the students on an individual basis. The researchers would further recommend starting a 4-H alumni association which could help the overall 4-H program by providing more individual attention to members and assisting more individuals with their projects.

5. The majority of students indicated that they had never helped to plan a 4-H club meeting or program, never traveled to another parish or state 4-H activity, and never been involved in a 4-H community service project.

The researchers would recommend that educational programs be developed to make students aware of all of the community service projects they as individuals can be involved in. The researchers would further recommend the leaders try to involve all members in at least one of these 4-H programs during the year.

6. Those students who said they never got involved in a community service activity were more likely to identify the items in the interest factor as influencing their decision not to re-enroll in 4-H.

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FACTORS INFLUENCING THE DECLINE IN ENROLLMENT OF JUNIOR HIGH 4-H CLUB MEMBERS

A CRITIQUE

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This study has some interesting parallels to the Van Tilburg study. Of course, we are dealing with youth as clientele rather than adults, but there are several comparisons that are appropriate. Burnett and Louque are trying to identify factors that influence enrollment decline. The factors for children seem to be quite different in some ways -- they are more motivated by social factors and peer relationships and less driven by the internal self-improvement and learning desires of adults. However, two factors stand out in common: both the content of Extension activities, as well as social processes, are factors in getting participation and encouraging persistence. I'm still confused about the difference between internal and external, real and perceived factors. It seems that all of the measurements from the respondents for this study were explaining their perceptions, be they real or perceived -- internal or external. The instrumentation process was solid and the response rate of 173/175 was tremendous. My only question is what happened to the two non-respondents?

The data was logically arranged and clearly presented in the tables. I could easily obtain an understanding of the major study results from a quick review of them.

The introduction of the factor analysis, with the related Table 4, confused me. I was unable to understand how the ten factors were developed. The explanation that they were "labeled by researchers" was insufficient. In addition, I didn't fully understand the meaning or significance of the ranking or the relationship to the selected characteristics. For example "interest factor" and "perceptions" both seemed to be very broad and encompassing categories not easily identifiable as distinct constructs.

The importance of community service activities and agent visits were identified as areas of needed attention in 4-H programming. Also, the importance of demonstrations and public presentations being involved in leadership positions and club planning were identified. Both represent significant findings and recommendations, but neither seemed related to the data that was presented. Perhaps a reading of the full study will explain more sufficiently how they flowed from the data.

I suggest that future researchers try utilizing a more qualitative research approach, perhaps using group interviews. Related research might try to include both those 4-H members who dropped as well as including those who continued. A more in-depth probing of this nature might identify new factors that deserve consideration.

FACTORS INFLUENCING THE OCCURRENCE OF ADULT AGRICULTURAL EDUCATION PROGRAMS

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INTRODUCTION

A question often posed is: Why should educational programs for adults be a part of vocational agriculture programs offered by high schools? Agricultural educators have addressed this question, and reasons have been reiterated for offering adult agricultural education programs (Hamlin, 1949; Hamonds, 1950; Morgan et al., 1976; Phipps, 1954; Newcomb et al., 1986). Major reasons presented for offering courses in agriculture for adults include (1) farmers and other persons in agriculture respond to adult courses if they have an opportunity to plan and manage the courses, (2) farm efficiency can be materially increased through adult education, (3) adults involved directly with the school or profiting directly from it are more likely to support the school, and (4) teaching adults is good for high school teachers of vocational agriculture.

Among the several factors that could influence whether or not a school offers an adult agricultural program are the attitudes and beliefs of superintendents, principals, and vocational agriculture instructors. The support of superintendents and local administrators for an adult program and their attitudes about and understanding of adult education have been documented as being associated with a school's offering or not offering an adult education program (Ekstrom and McClelland, 1952; Phipps, 1980; Loreen, 1958; Adelaine and Foster, 1987).

Proponents of adult agricultural education programs assert that teachers make or break programs for adults (Minich, 1956; Bender et al., 1972; Forsythe and Reece, 1981). It has been stated that "it is the vocational agriculture teacher who holds the critical role in determining whether a total program is offered or merely lip service is given to it" (Richardson, 1983) and that "a successful, quality young farmer/adult program depends directly upon the attitude, willingness to commit the necessary time, and dedication of the local vocational agriculture instructor" (Cavey, 1983).

Much of the research in adult education concerns the participation of adults in organized instruction. The research has emphasized situational and psychosocial barriers to participation, often overlooking institutional barriers. Research in adult education in agriculture fits this description also. Particularly lacking in agricultural education research is investigation of the impact of institutional barriers on whether or not a secondary school offering a vocational agriculture program also provides agricultural education programs for adults.

PURPOSE AND OBJECTIVES

One purpose of the research reported in this paper was to study the institutional factors that may influence the occurrence of adult agricultural programs in secondary schools where vocational agriculture is taught. The specific objectives were to investigate the relationships between the occurrence of an adult agricultural education program and the following institutional variables: 1) the perceptions of superintendents, principals, and secondary vocational agriculture instructors toward the benefit, need, funding, and operation of an adult agricultural education program; 2) the perceptions of vocational agriculture instructors toward external and personal factors that influence whether or not they teach adults; 3) recent adult education experiences of superintendents, principals, and secondary vocational agricultural instructors; 4) the number of vocational agriculture instructors in the secondary school; 5) the provisions of local school policy pertaining to the adult agricultural education program; 6) the existence in the school of a Young Farmer program and the characteristics of the program; 7) the scope and nature of the secondary vocational agricultural education program in the school; and 8) the number of farms in the county.

PROCEDURES

The population was all secondary schools in Ohio that offered vocational agriculture programs in agricultural production or farm business management during 1985-86 - a total of 260 schools. The schools were stratified into two groups: those receiving reimbursement from the Ohio Department of Education for adult programs in production agriculture or farm management (Adult Program group), and schools that did not claim or receive reimbursement for adult agricultural education programs (No Adult Program group). Since data were collected during the 1986-87 school year, schools constituting the frame were those in which the superintendent, principal, and vocational agriculture instructor(s) in 1986-87 were the same individuals as in 1985-86. Consequently, the frame consisted of 178 schools - 89 in the Adult Program group and 89 in the No Adult Program group. A stratified random sample of 42 schools from each group was drawn.

Data were obtained from researcher-designed questionnaires and from official records in the Ohio Department of Education. Content validity of the questionnaires was established by a panel of experts. The questionnaires were pilot tested with a group of superintendents, principals, and vocational agriculture instructors in schools not included in the sample. Cronbach's alpha coefficients for the attitude scale items were .87 for superintendents, .81 for principals, and .76 for vocational agriculture instructors.

Data from superintendents, principals, and vocational agriculture instructors were collected by mail questionnaire using procedures suggested by Dillman (1978). Of the 252 questionnaires mailed, 81 percent were returned. Since the unit of analysis is a school, complete data for a school required that usable questionnaires be returned from the superintendent, principal, and at least one vocational agriculture instructor in the school. Complete data, including usable questionnaires and data from records in the Ohio Department of Education, were available for 26 of the 42 schools in the Adult Program group and 20 of the 42 schools in the No Adult Program group.

For responses to questionnaire items, early, middle, and late respondents were compared with no significant differences between groups. Responses to the questionnaire of respondents from complete-unit schools (superintendent, principal, and vocational agriculture instructor responded) were compared also to respondents from schools where one or more of the individuals did not respond. This analysis did not reveal significant differences in the responses of superintendents, principals, or instructors between complete-unit schools and noncomplete-unit schools. Also, complete-unit schools were compared to noncomplete-unit schools on data collected from Ohio Department of Education records. These comparisons indicated no significant differences between the schools used in the analysis (complete-unit schools) and schools not used in the analysis (noncomplete-unit schools). The analyses reported in this paragraph indicate that nonresponse to the mail questionnaire is not a major threat to the external validity of the study.

RESULTS

Stepwise discriminant analysis was used to identify the variables investigated in the study that distinguish Adult Program schools from No Adult Program schools. Initially, stepwise discriminant analyses were performed on the following groups of variables: attitudes of superintendents, principals, and instructors; demographic characteristics of superintendents, principals, and instructors; young farmer program; and nature and size of the school's vocational agriculture program for secondary students. From each of these groups of variables, the variables that discriminate Adult Program schools from No Adult Program schools were combined with the additional variables number of vocational agriculture instructors, policy for adult education, and number of farms in the county. The final discriminate analysis used all of the variables to indentify the characteristics that differentiate schools that offer adult agricultural education programs from schools that do not.

Attitudes of superintendents, principals, and instructors

The group of attitude variables included 14 variables: attitudes of superintendents, principals, and instructors about benefits, need, funding, and operation of adult programs and the attitudes of instructors about external factors and personal factors that influence them to teach adults. Three of the 14 variables differentiate Adult Program schools from No Adult Program schools. Instructors in Adult Program schools indicated more strongly that adults should not pay fees for adult courses than instructors in No Adult Program schools. Both instructors and principals in Adult Program schools tended to have higher operation domain scores than did instructors in No Adult Program schools. Higher score on the operation domain scale indicate that instructors and principals believe that vocational agriculture teachers are competent to teach adults, that instructors should teach adults, and that vocational agriculture teachers have time to teach adults. All other variables in this group of 14 did not contribute significantly to the discrimination between the two groups of schools.

Demographic variables

Eight demographic characteristics of superintendents, principals, and vocational agriculture instructors were investigated. The variables were whether or not superintendents, principals, and instructors had experience in teaching adults during the past three years, whether they had received instruction in teaching or admininstering adult education programs during the past three years, the number of years instructors had taught vocational agriculture, and the number of years vocational agriculture instructors had taught adults. Four of these variables were found to discriminate Adult Program schools from No Adult Program schools.

A higher percentage of principals in schools with an adult program had received instruction in teaching or administering adult education programs during the past three years than was the case for principals in schools without an adult program. A higher percentage of the vocational agriculture instructors in the Adult Program schools had taught adults within the past three years than instructors in the No Adult Program schools. Also, instructors in schools offering adult courses have a higher average number of years teaching adults and a lower average number of years teaching vocational agriculture when compared to instructors in schools that did not offer adult courses.

Young farmer program

Both variables comprising the young farmer group differentiate Adult Program schools from No Adult Program schools. A higher percentage of the schools with adult programs reported the use of the adult program as the young farmer educational program. No Adult Program schools had a higher percentage of schools with a YF program that were not claimed as an adult program for reimbursement (6 of 20 schools) than Adult Program Schools (2 of 16 schools).

Scope and nature of secondary school program

Three variables described the scope and nature of the high school vocational agriculture program in the schools. These variables were enrollment in vocational agriculture, average number of supervised occupational experience instructional visits per student, and the level of activity of the school's FFA chapter. Only one of the three variables differentiates Adult Program schools from No Adult Program schools. Schools with adult programs, when compared to schools without adult programs, tend to have a higher average number of supervised occupational experience instructional visits per student. The number of high school students enrolled in vocational agriculture and the level of activity of the FFA chapter do not differentiate Adult Program schools from No Adult Program schools.

Comparison of adult program schools with no adult program schools

In addition to the 10 variables identified above that discriminate Adult Program schools from No Adult Program schools, three additional variables were entered into the final stepwise discriminant analysis to identify what variables differentiate the two groups of schools. The three additional variables were number of vocational agriculture instructors in the school, number of farms in the county, and a policy index indicating whether there is district or school policy about adult education, whether policy speaks specifically about vocational agriculture instructors teaching adults, whether policy for adult education is written or unwritten, and the degree of agreement among superintendents, principals, and instructors about district and school policy for adult education.

From the list of 13 possible discriminating variables, the discriminant function resulting from stepwise discriminant analysis included eight variables that discriminate Adult Program schools from No Adult Program schools (Table 1). The discriminant function is statistically significant (Wilks' lambda = .331; p < .001) and 91 percent of the schools are classified correctly by the discriminant function.

Adult Program schools, when compared to No Adult Program schools, tended to (Table 2):

- be more likely to use the young farmer program as the adult agricultural program for which reimbursement was claimed from the Ohio Department of Education;
- have, in a higher percentage of cases, vocational agriculture instructors who had taught adults within the past three years;
- have, in a higher percentage of cases, principals who had received instruction in teaching or administering adult education programs within the past three years;
- have vocational agriculture instructors who had a higher average number of years teaching adults; and
- have higher policy index scores indicating to a greater extent the existence of district and school policy about adult education and a greater degree of agreement among superintendents, principals, and vocational agriculture instructors about the existence and nature of district and school policy for adult education.

No Adult Program schools, when compared to Adult Programs schools, tended to (Table 2):

- have a higher percentage of young farmer programs not claimed as the reimbursed adult program;
- have vocational agriculture instructors who indicated more strongly that adults should pay fees for adult agricultural education programs; and
- have a higher number of high school vocational agriculture instructors per school.

CONCLUSIONS AND RECOMMENDATIONS

The following is concluded about the influence of certain factors on whether or not high schools offering vocational agriculture in Ohio also offer an adult education program in agriculture for which they claim reimbursement from the Ohio Department of Education.

- Vocational agriculture instructors are important in a school's decision to offer or not offer an adult education program. It is concluded that the attitudes of instructors, particularly their attitude toward the adults' role in funding adult programs, the instructor's recent experience in teaching adults, and the number of years they have taught adults are particularly important in differentiating schools offering adult education programs from schools that do not.

- High school principals are also important. From this research, it is concluded that schools offering adult education programs are more likely to be staffed by principals who have recently received instruction about adult education.

- Closely related to the influence of instructors and principals is the extent and nature of policy about adult education as a function of the school. The more explicit policy there is in a school and the greater the agreement between administrators and instructors about this policy the more likely the school is to offer adult courses.

- If a school offers a young farmer program, the school usually claims that program as the adult education program for which reimbursement is received from the Ohio Department of Education.

- Contrary to what might be expected, the research revealed that schools offering adult programs have fewer vocational agriculture instructors per school than schools that do not offer an adult program. This conclusion is consistent with the finding that the nature and scope of the high school vocational agriculture program in the school is not a significant factor in differentiating schools that offer adult programs.

These conclusions lead to the following recommendations. In Ohio, state department of education personnel and teacher educators should be cognizant of the following in designing strategies and activities to improve and expand the offering of adult education in agriculture by high schools that provide vocational agriculture programs.

- When working with schools regarding adult education, it is important that school administrators, as well as vocational agriculture instructors, be the focus of consultation and advisement. Not only are the attitudes of principals and instructors important in the decision-making process, but both the existence and explicitness of policy regarding adult education as a function of the school are important in influencing whether or not an adult program is offered.

- The research confirms that the attitude, competence, and experience of vocational agriculture instructors in teaching adults are important in determining whether or not adult education is a part of the school's vocational agriculture program. Consequently, preservice and inservice instruction and supervision specific to planning, conducting, and evaluating adult education programs are essential if instructors are to acquire and demonstrate the competence and commitment required to teach adults.

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TABLE I

SUMMARY DATA FOR DISCRIMINANT FUNCTION

Discriminating Variables	Standardized Canonical Coefficients	Structure Coefficients
Adult Program Is the YF Program	.893	.501
Have Young Farmer Program	-.817	.232
Instructor Taught Adults	.709	.432
Principal Received Instruction	.423	.090
Years Instructor Taught Adults	.374	.393
Instructor Attitude: Funding	-.400	-.280
Policy Index	.327	.295
Number Vo-Ag Instructors	-.389	-.109

Eigenvalue = 2.02; Canonical correlation = .82
Wilks' lambda = .331 (p<.001)

Group	Number of Cases	Predicted Group Membership Group 1	 Group 2
1 Adult Program	26	24 92.3%	2 7.7%
2 No Adult Program	20	2 10.0%	18 90.0%

Percent cases correctly classified = 91.3%

TABLE 2

CHARACTERISTICS OF ADULT PROGRAM SCHOOLS AND NO ADULT PROGRAM SCHOOLS ON DISCRIMINATING VARIABLES

Variable	Adult Program (n=26)	No Adult Program (n=20)
YF Program is the Reimbursed Adult Education Program	53.8%	0.0%
YF Program Not Claimed as Reimbursed Adult Program	12.5%	30.0%
Instructor Taught Adults Last Three Years	100.0%	60.0%
Principal Received Instruction About Adults Last Three Years	19.2%	10.0%
Years Instructors Have Taught Adults (Mean)	13.0	5.5
Instructors Attitude: Funding (Mean Score[a])	4.9	6.1
Policy Index (Mean Score[b])	3.54	1.75
Number Vo-Ag Instructors Per School (Mean)	1.23	1.40

[a] Higher scores indicate that adults enrolled should pay fees. Minimum possible score = 2; Maximum possible score = 10.

[b] Higher scores indicate more explicit district and school policy for adult education and a higher degree of agreement among superintendents, principals, and instructors about policy. Minimum possible score = 1; maximum possible score = 7.

FACTORS INFLUENCING THE OCCURRENCE OF ADULT EDUCATION PROGRAMS

A Critique

Dennis C. Scanlon, The Pennsylvania State University--Discussant

In a day and age when the national topics of discussion involve expanding curriculum and clientele to serve a broader base, it is particularly interesting to me that this study reexamines a traditional groups ... adults, and what factors combine to stimulate adult programming in the educational community.

I found the research design to be interesting ... particularly the sampling procedure. the original group of 178 schools were broken into two groups ... 89 in the Adult Program group receiving reimbursement from the Ohio Department of Education and 89 in the No Adult Program group who did not claim or receive reimbursement for adult programs. What was the rationale for using the variable reimbursement as a basis for stratification? Is reimbursement in some way related to quality programming? Was this the intent of the original stratification? Since existence and quality occur simultaneously at some level, it would seem logical to assume that the researchers would want to be able to distinguish among programs in the hope that better programs possessed some or all of the variables of interest, thereby establishing some sort of scale that related directly to the variables of interest.

Now let me raise some questions about the sampling procedure. Forty-two schools were randomly sampled from each of the original groups of 89 giving a potential of 84 sampling units. Of the 42 schools in the reimbursed category complete data were available from 26 suggesting that 16 or 35% of the sample did not respond. Of the 42 schools in the non-reimbursed category data were available from 20 schools suggesting that 22 or 52% of the sample did not respond. The researchers talk about comparing non-complete unit schools used in the analysis on both the response to the questionnaire and data available from the Ohio Department of Education. What is not clear is whether the comparison was within groups, i.e., respondents vs. non-respondents within the reimbursaable category and non-reimbursement category or across groups, i.e., total respondents with total non-respondents.

The discriminant analysis function was appropriately used and reported in a very "consumable" fashion so that the reader could easily grasp the important points. I would commend the researchers for developing a discriminant equation with predictability of 91%. And finally, the conclusions were within the parameters of the findings.In short the study was extremely well done and the researchers are to be commended. In essence what the researchers have done is describe prerequisite conditions which encourage adult education in secondary ag programs contingent upon someone recognizing the need for adult education.

Increasingly, school systems are viewing themselves exclusively as serving a secondary population with little or no responsibility to service the adult segment of the population. This attitude is both prohibitive and outdated. And therefore I would applaud the researchers for making two extremely appropriate recommendations.

1. Work not only with ag teachers but with school administrators to change attitudes and develop appropriate school policy regarding adult education, and

2. Teacher education institutions and state supervisors must plan preservice, inservice and supervision programs specific to planning, conducting and evaluating adult education programs to provide instructors with the competence and commitment necessary to teach adults.

My congratulations for a well done piece of work.

FACTORS RELATED TO THE DECISIONS OF RURAL PUBLIC HIGH SCHOOL STUDENTS TO PARTICIPATE IN VOCATIONAL EDUCATION

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INTRODUCTION

High school graduation requirements increased throughout the United States as a result of The National Commission on Excellence in Education's report, "A Nation at Risk" (The National Commission on Secondary Vocational Education, 1984). This increase created additional burdens for high school students, especially those contemplating enrolling in elective courses. Students pondering college needed to complete classes in addition to those required for graduation in order to meet entrance requirements.

Rural public high school students faced an additional problem. The elective course selection was often limited in their school districts (Barker, 1985; Barker et al. 1984; and Beckner, 1985). In addition, while some states offered high quality vocational education programs to all students, Bottoms and Copa (1983) and Swanson (1982) noted that 4/5 of the high school students did not have access to highly specialized and diversified vocational education programs, particularly students attending rural schools. Vocational education of any kind was available for only 70 percent of high school students (Campbell & Elliot, 1988). This was significant given that approximately 30 percent of the school aged population were enrolled in rural high schools, and rural schools comprised roughly 75 percent of all the schools in the United States (National Center for Educational Statistics, 1981). Despite the additional graduation requirements and the limited vocational offerings in rural schools, students still enrolled in vocational education courses.

Only limited information was available concerning factors influencing rural public high school students to enroll in vocational education. Personal contacts by vocational teachers and former or present students appeared to influence students to enroll in vocational programs (Lejeune, 1977; Pershing & Schwandt, 1980; Scanlon et al., 1984). Dube (1987) agreed that effective means were needed to recruit students, but a satisfying program was necessary to retain current students. Otto (1987) and Abendroth (1985) claimed parents were the most influential group on students' decision-making processes, yet Osguthorpe (1976) and Beukes (1986) disagreed and stated parents as well as the influence of guidance counselors, teachers, and friends had an insignificant impact on students' decisions of occupational choice and career decision.

Harr (1983) recorded a variety of reasons for entering a vocational education program. Some of the more notable reasons follow: 1) to learn a specific skill, 2) job opportunities, 3) pre-vocational experiences, 4) influence of counselor or friends, 5) visit to the vocational center, and 6) room in one's schedule. Scanlon et al. (1984) and Abendroth (1985) recorded barriers preventing or curtailing enrollment in vocational education programs. The most prominent findings follow: 1) transportation to a joint vocational school, 2) the quality of the vocational courses, and 3) length of time in a vocational course.

Smith et al. (1986) compared students' perceived outcomes of vocational education. This study failed to directly confront the issue of why a student enrolls in vocational education. The lack of studies addressing this issue, especially in the rural setting, and the conflicting findings indicated a need for research to be initiated.

PURPOSE AND OBJECTIVES

The purpose of this study was to identify the factors related to the decisions of rural high school students to participate in vocational education. The specific objectives of this study were:

1. To compare the individual characteristics of rural public high school graduates who completed higher proportions of their course work in vocational education with those rural public high school graduates who completed lower proportions of their course work in vocational education.

2. To compare the individual characteristics of rural public high school students who planned to complete high proportions of their course work in vocational education at comprehensive schools with those rural public high school students who intended to complete high proportions of their course work in vocational education at vocational schools (JVS's).

3. To determine the reasons rural public high school students enroll in vocational education courses.

PROCEDURES

Two national longitudinal data bases, High School and Beyond (HS&B) and the National Survey of Labor Market Experience-New Youth Cohort (NLS), provided the bases for analyses for objective one. In addition, a face-to-face survey and replica questionnaire were administered to a small randomly selected sample of Ohio rural public high school students. The Ohio information was used to address objectives two and three.

Objective One

The High School and Beyond (HS&B) survey involved approximately 28,000 high school seniors and 30,000 sophomores originally interviewed in 1980. Since that time, follow-up surveys have been conducted every two years. Transcript information was collected from a representative sample (18,427) of the original 30,000 sophomores interviewed in 1980. This study utilized data from 1372 rural public high school students who graduated in 1982.

The National Survey of Labor Market Experience-Youth Cohort (NLS) contained 12,868 individuals ranging in age from 14-21 years at the time of the first interviews in 1979. Follow-up interviews occurred annually from 1979 to 1985. Transcript data were collected from over 80% of the members representing the sample. Three-hundred and nine rural public high school students who graduated in 1982 provided the data for this study.

The dependent variable for the regression analyses was the proportion of time a student spent in vocational courses. This was calculated by dividing the number of vocational credits by the total number of credits earned during high school. For example, students who graduated with 6 vocational credits and a total of 24 credits spent 25% (6/24 = .25) of their time in vocational courses.

For descriptive purposes, respondents were classified as vocational education graduates if they completed over 12.5% of their course work in vocational education. Campbell et al. (1981) established five levels of vocational concentration for high school graduates. Students were classified as being in a vocational curriculum if they were labeled as a Concentrator, Limited Concentrator, or Concentrator/Explorer, which meant they usually took more than 12.5 % of their course work in vocational education.

Independent variables included: community unemployment rate, self esteem, absenteeism, 10th- and 12th-grade GPA's, specialty GPA (NLS), who the student lived with at age 14 (NLS), where the student lived at age 14 (NLS), job aspiration at age 35 (HS&B), locus of control (NLS), perceptions of approval from significant others on the decision to attend college and to enter the labor market after high school (NLS), hours watching TV, father's occupation, membership and involvement in vocational education youth organizations, participation in vocational work experience programs, ASVAB score (NLS), and (HS&B) Verbal and Math scores. Factors over which respondents had little or no control such as race/ethnicity, gender, socioeconomic status (SES), size of school (HS&B), year of graduation (NLS), and residential location served as control variables.

Validity and reliability for the selected variables and the replica questionnaire were documented in past editions of the HS&B Data File User's Manual and the NLS Data File User's Manual.

Objectives Two and Three

Fifty-two Ohio high schools were identified as rural. Eight of these schools were randomly selected for this study. Fifteen sophomore students who were planning to enroll in vocational education their junior year were randomly selected from each school as the sample. One-hundred-five students were present with parental permission slips the day of the interview.

The replica questionnaire assessed the individual characteristics of the rural public high school students who planned to complete high proportions of their course work in vocational education at both comprehensive and vocational schools. A field test determined the usability of the replica questionnaire.

The face-to-face survey was designed to determine the reasons why Ohio rural public high school students enroll in vocational education courses. Content validity was established by a panel of experts. Face validity was assessed by examining comments from a field test at a rural high school not included in the sample. Any vague or confusing questions were amended.

ANALYSIS OF DATA

Numeric data were analyzed using the Statistical Packages for Social Sciences/PC+ (SPSS, Inc., 1987). The primary methods of statistical analyses were descriptive, correlation, one-way ANOVA, Chi-square, t-test, and multivariate regression (alpha = 0.05). The reference group for the regression analyses consisted of white males, living in the Midwest, and in NLS low absenteeism rate or in HS&B schools size 5 (300-499 in the senior class). Cross tabulations were utilized to obtain descriptive information.

The Ohio survey interview results were analyzed using qualitative research methods. Categories developed as the results emerged from the data. The information was used to supplement the findings from the longitudinal data bases. Demographic, program, and personal data gathered with the replica questionnaire were used to make comparisons with the longitudinal cohorts.

RESULTS

In the NLS data base, achieving higher ASVAB scores, being classified as a Hispanic or Native American, and those with a missing vocational specialty GPA were negatively associated with completing higher proportions of vocational education courses. Completing higher proportions of vocational education courses was positively associated with vocational work experience programs and high absenteeism.

Variables that were positively associated with completing higher proportions of vocational education courses in the HS&B data base included: membership and leadership roles in vocational youth clubs, participation in vocational work experience programs, the desire to work in a vocational job at age 35, and classification as a white or Hispanic female. Variables that were negatively associated with completing higher proportions of vocational education courses included: higher self-esteem ratings, higher SES ratings, higher HS&B Math and Verbal scores, educational aspirations, students without absenteeism records, respondents residing in the South, West, and Northeast and being classified as a Hispanic male.

A significant difference in the level of SES and two components of SES, father's occupation and family income, was found between Ohio students who planned to enroll at JVS's their junior year and those students who planned to complete higher proportions of vocational education at comprehensive schools. Students going to the JVS their junior year came from families with a lower SES rating than those students who planned to complete high proportions of vocational education at comprehensive schools. In addition, students planning to attend the JVS had lower GPA's than students who planned to remain at their home schools their junior year.

Job preparation ranked as the number one reason (58%) why Ohio students enrolled in vocational education courses. Enjoyment of vocational subject matter and the environment in which the vocational education courses were taught ranked second (52%). Other reasons to enroll in vocational education courses included personal reasons, monetary benefits, perceived ease of grades, attraction of affiliated youth organizations, preparation for education beyond the secondary level, positive prior experiences with vocational teachers, and contacts with individuals in vocational trades.

CONCLUSIONS

Some general patterns emerged from the two data bases. Rural students who completed higher proportions of their course work in vocational education scored lower on ability and self-esteem tests and were from families in lower SES levels, yet no difference in high school GPA's was found. Some motivational variables, such as being a member or leader in a vocational youth organization, participation in vocational work experience programs, the desire to work in a vocational job at age 35, and not seeking postsecondary education, surfaced as being associated with graduates who completed higher proportions of vocational education.

Students enrolled in vocational education courses at the home school felt a sense of belonging. Few people not associated with JVS's spoke highly of them. In addition to the clustering of vocational students in lower SES and ability quartiles, further clustering occurred within vocational education. When compared to home school vocational students, students attending JVS's were significantly lower in ability and SES.

Job preparation was ranked most often as the reason why respondents enrolled in vocational education, but students also enrolled in vocational education for reasons other than job preparation. Students anticipated success in upper division high school vocational education courses because they had previously experienced success in vocational courses, liked the vocational teachers, and enjoyed the subject matter. Rural public high school students believed that enrollment in vocational education would help them acquire jobs, yet not prevent them from attending college. However, most students were uncertain if their present curricula plans would meet college entrance requirements.

Discussion

Vocational education attracts individuals from lower SES and ability levels. This pattern will continue to be the norm unless major substantive changes occur in vocational education. Vocational education is perceived to provide training for jobs and restrict advancement to higher education. Vocational educators need to compare their purposes and definitions of vocational education with the broad purposes and definition suggested by the National Commission on Secondary Vocational Education (1984) and then adjust accordingly. The Commission suggested that vocational education courses emphasize the development of students' computational, writing, and problem solving skills.

Does the fact that no difference was found in high school GPA imply that today's schools are promoting a dual education system where "academic" GPA's and "vocational" GPA's can be equal, but in reality have no bearing when comparing students' educational abilities or backgrounds? One counselor indicated that in his district an academic "A" was worth 5 points compared to a vocational "A" which was worth 4 points. This procedure was followed to prevent vocational students from becoming the schools' valedictorians and winning scholarships which, according to an unwritten policy, should rightfully go to college prep students because they completed harder and more meaningful courses.

Vocational students appear to segregate according to SES and ability levels. Placing vocational and academic education on separate campuses proliferates the image that vocational education is for lower ability persons. John Dewey (1913) warned against a dual education system as he felt it would accentuate class divisions both in and out of school. It appears that Dewey was right.

Vocational educators should emphasize in their recruitment efforts that some students enroll in vocational education courses for reasons other than job preparation. The discrepancy between reasons for enrollment in vocational education and current definitions of vocational education need to be researched.

RECOMMENDATIONS

Recommendations for educators include:

1) Not allowing vocational courses to monopolize the school day. Research indicated that a blend of academic, general, and vocational courses prepares students better than a concentration in any one area.
2) Incorporating and emphasizing computational and writing skills in all vocational courses. Math, English, history, and other academic courses will always be necessary, but supporting basic concepts and encouraging students to appreciate and use proper grammar should be proliferated by all teachers.

Recommendations for researchers follow:

1) This study should be expanded to include suburban and urban public high school students. Comparing the findings from the rural setting with all students would enhance the knowledge base in this area.

2) Longitudinal studies, such as NLS and HS&B, should be continued, and longitudinal studies that include new cohorts should be initiated. This would provide data to assess if more recent high school graduates (than the ones in NLS and HS&B) have altered their vocational enrollment patterns since the advent of requiring additional graduation requirements was begun in the early 1980's.

3) More studies of this nature, combining quantitative data with qualitative methods, need to be encouraged, as they enhance the final results and give additional meaning to the numbers produced in calculations.

4) The wide range in the percentage of the number of students enrolled from each school who elect to enroll at the joint vocational schools requires further investigation.

5) Differences between students in joint vocational schools and comprehensive high schools needs further research.

In William Bennett's recent report (1988), American Education: Making it Work, vocational education was viewed as having only one purpose, to train students for jobs. Presently, society does not fully understand that there exists more than one purpose for vocational education, and that many factors influence students to enroll in vocational courses. The information in this study should assist educators in developing recruitment procedures that could result in encouraging the appropriate students to enroll in vocational education courses and in modernizing vocational curricula to meet the demands of rural public high school students.

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FACTORS RELATED TO THE DECISIONS OF RURAL PUBLIC HIGH SCHOOL STUDENTS TO PARTICIPATE IN VOCATIONAL EDUCATION
A CRITIQUE

David L. Howell, University of New Hampshire--Discussant

This study attempts to answer the question of "why a student enrolls in vocational education." The authors are to be commended for their use of data bases generated by two national longitudinal studies and adding their own interviews. In this way they were able to use both quantitative and qualitative research methods to address their question.

Strengths

The introduction provides an excellent yet concise review of the literature establishing a good theoretical framework for the need for the study. The research objectives were clear and the findings address the objectives.

The conclusions, discussion and recommendations provide the reader with much to consider in terms of what this study means which I found very helpful.

Weaknesses

The authors reported that the validity and reliability of the selected variables and the replica questionnaire were documented but did not state what they were. Such information is important enough that it should be included in a report of this kind.

They also state that the interview survey which they developed was checked for face and content validity but no report was given for its reliability. That makes it impossible to evaluate the results of the study.

Tables reporting the results would have been helpful but I assume that this is not a total report of the findings. It would be better to limit the discussion and the recommendations than to limit reporting the results. The authors suggest that other statistical analyses were used with the study but do not report any findings. I would suggest that at least a footnote be included concerning these results or that the study be divided into several separate reports.

Recommendations

Studies of this nature require action on our part for implementation. Much has been learned related to enrollment in vocational education which is important to apply if we are to increase our student numbers.

FACULTY DEVELOPMENT NEEDS OF NEVADA COOPERATIVE EXTENSION

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FACULTY DEVELOPMENT NEEDS OF NEVADA COOPERATIVE EXTENSION

INTRODUCTION

The concept of "needs assessment" has evolved since the mid-sixties as a direct offshoot of the social action legislation period (Stufflebeam, et al., 1985). The logic behind identifying educational needs stems from the desire to design and implement relevant educational programs which are based upon measurable and achievable goals and objectives. Gathering data from potential clientele and actively involving them in the process of identifying potential educational programs increases the likelihood of implementing educational programs which are relevant and thus increases the likelihood of achieving appropriate outcomes. This paper describes an educational needs assessment process which was employed in an attempt to develop a prioritized list of educational needs for extension field faculty.

Problem Statement

Although the literature related to conducting educational needs assessment is quite abundant, specific literature related to the tools and methods which are useful in the process is somewhat less available. One commonly used method for identifying the educational needs of large, or sparsely populated, audiences is the mailed questionnaire. Generally, educational program planners gather initial information about a particular audience and design an appropriate questionnaire to elicit information from that audience regarding its perceived importance of identified topics. Through some logical process the topics are ranked relative to their perceived importance and educational programs are developed based upon those rankings.

Use of such tools as the Delphi Technique (Gordon and Helmar, 1966), Q-sort (cited in Anastasi, 1982), and other self-reporting attitudinal surveys is common in gathering such information from potential clientele groups. The effectiveness of planning educational programs based upon these types of data is greatly dependent upon how validly and reliably the program planner measures these clientele perceptions. One limitation of these more commonly used assessment tools is the difference in criteria individual respondents may use when relating their perceived importance of identified topics. For example, when respondents rate the teaching of a specific skill as "very important", are they saying that it is something they need to learn more about, or are they saying they have found this skill to be extremely important to their job functions and therefore already know how to do it? The first interpretation identifies a perceived need for more education while the other implies something entirely different.

A needs assessment model developed by Borich (1980) and further used by Barrick and others (1983, 1985) appears to have merit for adding validity to the process of assessing respondents' perceptions about the importance of educational program needs, particularly in the area of inservice education for homogeneous groups of people. Unlike the Delphi Technique and Q-sort methodologies commonly used in other models which simply ask respondents to rate or rank a topic based upon their perceptions of its importance, Borich attempts to gather additional information from the respondents regarding their current knowledge of the topic and their ability to apply this knowledge. Collecting this additional information increases the likelihood of planning inservice education programs which will be of most importance. For example, if one were to ask an extension agent how important it was to plan inservice programs related to "the use of microcomputers", it is highly unlikely that the agent would not think such programs would be "extremely important", since most agents need to use such equipment on a daily basis. Yet, if the agent already has a significant amount of proficiency with microcomputers, it is unlikely that he or she would benefit from or participate in additional inservice related to this subject. By analyzing data regarding perceived importance and current knowledge about a particular topic, one may learn more about the actual need for inservice education. By using the additional information to compute a "weighted" importance score, a program planner can develop a prioritized list of inservice needs based upon both perceived importance and knowledge of the topic.

An additional piece of information which may enhance the model developed by Borich may be acquired by asking respondents what their opportunity would be for using additional information if it were offered to them. In the previous example regarding the microcomputers, agents might think the topic is extremely important and their existing knowledge might be extremely low. However, if they currently did not have access to a microcomputer and their budgetary restraints would not allow them to purchase one in the near future, their opportunity to use inservice would be low. As a result, the need for inservice related to the topic would also be low.

PURPOSES AND OBJECTIVES OF THE STUDY

A primary purpose of this study was to identify staff development needs of extension field faculty in Nevada. Another purpose was to further study the model developed by Borich (1980) and attempt to enhance the model by building upon earlier work completed by Barrick, Ladewig, and Hedges (1983) and Barrick and Powell (1985). Specifically, the following research questions were used to guide the study:

1. What are the current staff development needs of field faculty within the Nevada Cooperative Extension System?
2. What are the relationships among faculty perceptions of "importance", "existing personal knowledge", and "opportunity to use additional information" regarding the topics which are identified in the study?
3. Will use of the Borich Needs Assessment Model provide information which will add validity to the findings of the study over that which would be present when using more traditional survey techniques?

PROCEDURES

The population for this study was all field faculty employed by the Nevada Cooperative Extension System (N=68). Since the population was relatively small, a census study was employed and no inferential procedures were necessary to generalize to the group.

The study required the use of two sequential questionnaires which were mailed to each field faculty member. Each questionnaire was accompanied by an appropriate coverletter explaining the purpose of the study and how the results would be used. A pre-addressed, stamped return envelope was also included with each questionnaire. Utilizing appropriate follow-up procedures, a response rate of 90 percent (61 out of 68) was achieved from the first questionnaire and a response rate of 99 percent (67 out of 68) was achieved from the second. Although response rates were considered excellent, a study of differences between responses from the first mailing and the second mailing for each questionnaire was conducted. For both questionnaires, there were substantively no differences between mean responses of early (first mailing) returns and late (second mailing) returns. Therefore, the researchers concluded there was no bias in response added to the findings associated with a respondent's choosing not to respond to the first mailing.

The first questionnaire was open-ended in format and asked each respondent to list (and provide a brief description of) any staff development topics they felt were needed for field faculty. Responses to the first questionnaire resulted in over 350 individual statements of topics. A thorough analysis of these statements resulted in the combining of many of the topics which had similar emphasis and descriptors. The original list of over 350 topics was reduced to 65 non-duplicated topics. The topics were then grouped into nine logical groupings as they related to: 1) teaching methodology, 2) program planning, implementation, and evaluation, 3) professional improvement, 4) program funding, 5) group processing skills, 6) marketing extension programs, 7) technical training in horticulture and plant science, 8) technical training in use of computers, and, 9) extension philosophy. (NOTE: Topics were grouped on the basis of their similarity after analysis. There were no "suggested topics" or pre-conceived ideas of what they might be prior to mailing the first questionnaire.)

The second questionnaire was developed using the nine groups of topics identified in the first phase of the study. Each topic was listed in random order by group, and three Likert-type rating scales were placed beside each topic. After reading each topic, respondents were asked to rate (1=low 5=high):

1. how important they perceive this topic to be,
2. what their current knowledge of this topic is, and,
3. what would be their opportunity to use additional information related to this topic in their present job?"

ANALYSIS OF DATA

Although inter-item consistency of the scales was not of major importance to the outcome of this study, Cronbach's alpha coefficients were calculated in order to determine if the earlier logical grouping of the topics into nine sub-groups withstood the test of a homogeneous sub-scale. That is, for each sub-group, did respondents, who rated the overall sub-group "high", rate each topic within that sub-group similarly "high", and vice versa. With the exception of the Extension Philosophy Sub-group, all scales had calculated alpha coefficients ranging from .96 to .75 with an average alpha of .88. The Extension Philosophy Sub-group contained those topics which tended to be somewhat controversial (e.g. discussing the role of an extension staff member as it relates to new administrative procedures, etc.). The alpha coefficient for this sub-group was .58. Since some topics were more provocative than others, it was not logical to expect a higher coefficient.

Two sets of weighted scores were calculated for each topic based upon respondents' ratings on each of the three criteria. The first weighted score was calculated as suggested by Barrick, Ladewig, and Hedges, (1983, p 13) by subtracting the knowledge score from the importance score and then multiplying by the importance score. A second weighted score was calculated similarly by subtracting the opportunity score from the importance score and multiplying by the importance score. (NOTE: All opportunity scores were treated as "negative statements" and were appropriately recoded in order to produce a weighted score which would be comparable to the score weighted for knowledge.) The researchers believed the opportunity weighted score should be considered equal to the knowledge weighted score when attempting to prioritize topics so both scores were simply added together and divided by two in order to produce the final score used for ranking each topic. In summary, the following equation produced the score used for ranking each topic:

$$([(I - K) \times I] + [(I - O) \times I])/2$$

Key: I = Importance Score K = Knowledge Score O = Opportunity Score

Therefore, scores for each topic could theoretically range from +20 to -4. Interpretation of the calculated scores is suggested as follows:

1. A topic which has a negative score would be considered inappropriate for use in developing inservice programs since it resulted from a combination of either a very low importance score, a very high knowledge score, or a very low opportunity score.
2. A topic with a score which is relatively close to zero also would not be considered appropriate since it would seem that existing knowledge of the topic, or the opportunity to use new knowledge, is equal to the respondents' perceived importance of the topic.
3. Those topics having positive scores should be rank-ordered and programming would be planned around those having the highest values.

In order to address the final two research questions, bivariate correlation coefficients and regression equations were calculated using the three criterion scores (importance, knowledge, and opportunity).

Discussion

1. What are the current staff development needs for field faculty within the Nevada Cooperative Extension System?

Each topic was rank-ordered by its weighted score and those with highest rankings were selected for planning staff development programs to be presented at the annual staff development conference. Since further analysis of the scores indicated that faculty from the four extension administrative areas differed greatly in their perceptions of needs, it was also decided to develop programs to be delivered in each administrative area based upon perceptions from the faculty of each administrative area. Topics identified as most important based upon the scores of all faculty are listed in Table 1. (Only the two highest scored topics from each of the nine sub-groups are listed.).

Insert Table 1 about here

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2. What are the relationships among perceptions of "importance", "existing personal knowledge", and "opportunity to use additional information" regarding the topics which are identified in the study?

Bivariate correlation coefficients were calculated among the three criterion scores in an effort to determine the relationships among them. If the correlation between any two of the scores was high, the logic of using both scores as criteria for determining need would not be supported. However, if correlations were low-to-moderate, each score should be used in the process of rank-ordering the topics. As indicated in Table 2, correlations among the three criterion scores were low, at best (Hinkle, et al., 1988, p.118). The maximum explained variance associated with any two of them was 17 percent ($r=.42$).

Insert Table 2 about here

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3. Will use of the Modified Borich Needs Assessment Model provide information which will add validity to the findings of the study over that which would be present when using more traditional survey techniques?

Although the answer to this question is perhaps more philosophical than analytical, it seemed logical to explore the relationships among the scores further to determine if the addition of the knowledge scores and opportunity scores is contributing anything to the needs assessment model above and beyond the information gained by simply asking respondents to rank each topic based upon his/her perception of its importance. If one were to study the variance in each of the three scores which is not explained by the other two when they were entered into a regression equation ($1-R^2$), a determination could be made regarding whether each score was independently adding anything to the model. (E.g. If most of the variance in the importance score could be accounted for by the combined variance in knowledge and opportunity scores, there would be no logic in using them along with the importance score to determine educational needs since importance would be an adequate "proxy" of the other two scores.) As indicated in Figure 1, 61 percent of the variance in importance scores is unexplained when knowledge and opportunity scores are regressed upon importance scores (see part A). Further, 77 percent of the variance in knowledge scores is left unexplained when importance scores and opportunity scores are regressed upon the knowledge score (see part B). Finally, 78 percent of the variance in opportunity scores is left unexplained when importance and knowledge scores are regressed upon opportunity scores (see part C). No single score, or a combination of any two, is an adequate "proxy" of the other. Therefore, each score is contributing additional information to the model.

Insert Figure 1 about here

CONCLUSIONS AND/OR RECOMMENDATIONS

The modified Borich Model described in this article was used in the needs assessment in an effort to more validly measure perceived educational needs of extension field faculty. Based upon analysis of data, rankings of individual topics were substantively different than rankings which would have been obtained by asking respondents to simply rate them with regard to their importance. The additional information appears to add to the validity of the needs assessment process. Educational programs based upon the information gathered during this process were deemed extremely successful by faculty in their post-conference evaluation forms. Much of the success of the programs is believed to be attributable to closely involving every faculty member in the needs assessment process and correctly measuring those needs. Based upon these results, the researchers would recommend the use of this model in determining inservice educational needs of similar groups of clientele.

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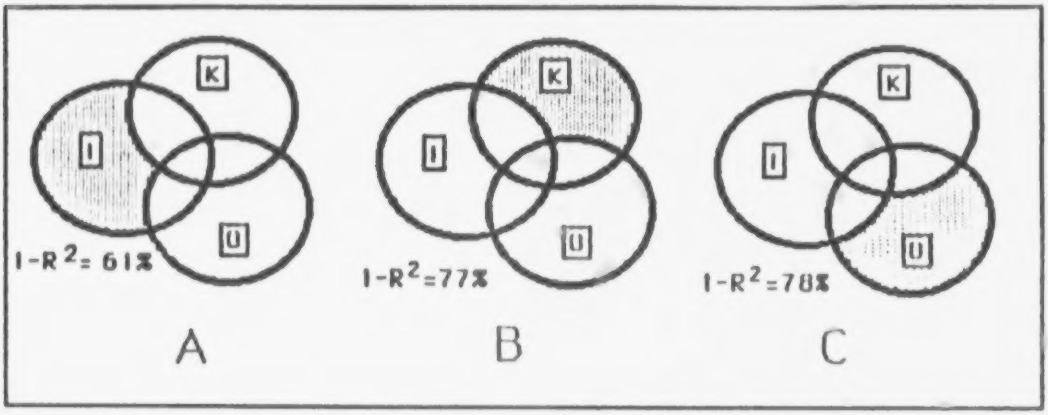
Table 1. Highest Ranked Topics From Each Of Nine Sub-Groupings of Staff Development Needs

Sub-group	Topic	Score
I. Teaching Methods		
	1. How to utilize distance or remote teach-methodologies in order to reach sparsely populated clientele groups.	7.5
	2. How to write and publish quality extension fact sheets.	7.2
II. Program Planning, Implementation, and Evaluation		
	1. How to conduct impact studies which determine long-range program effectiveness and accountability.	7.7
	2. Developing program evaluation instruments, attitudinal scales, and other surveys.	6.8
III. Professional Improvement		
	1. Using program evaluation data to develop personnel evaluations.	9.0
	2. Writing professional goals which are tailored to meet annual evaluation needs.	7.8
IV. Program Funding		
	1. Improving grant-writing skills.	9.0
	2. How to identify sources of funding for programs.	8.2
V. Group Process Skills		
	1. Effectively managing volunteers.	6.3
	2. Learning group facilitating techniques.	5.0
VI. Marketing Extension		
	1. How to "package" and market extension educational programs.	8.4
	2. How to create the "proper" image for the Cooperative Extension System.	7.0
VII. Technical Training In Horticulture and Plant Science		
	1. Identification of horticultural insect damage problems.	4.5
	2. Identification of horticultural plant diseases.	3.9
VIII. Technical Training in Use Of Computers		
	1. Selecting hardware and software.	5.3
	2. Training in basic micro-computer use (word processing, data management, etc.)	4.6
IX. Extension Philosophy		
	1. Discussion of the role of each extension professional as he/she fits into the Nevada Area Administrative Model.	4.8
	2. Understanding the extension philosophy and mission.	4.3

Table 2. Pearsonian Correlations Among Scores On Importance, Knowledge, and Opportunity

	Knowledge	Opportunity
Importance	.42	.17
Knowledge		.13

Figure 1. Unexplained Variance In Each Criterion Score When The Other Two Scores Are Regressed Over It ($1-R^2$).


K
I
U
1-R²= 61%
A
K
I
U
1-R²=77%
B
K
I
U
1-R²=78%
C

Faculty Development Needs of Nevada
Cooperative Extension
A Critique

Gregory A. Nolting, University of Missouri--Discussant

The authors of this study have my congratulations for both the subject they chose and the overall quality of the study. This is a task that all states are concerned with to some degree, however few understand the task as well as the authors. This study went the extra step and evaluated the process as well. This extra step makes this an extremely worthwhile study.

There are several areas that were stated clear and concise. Among them were the statement of the problem and the purpose and objectives. These areas set the stage for an understandable paper.

The return rate for this study was exceptional. This may say something for the procedure and the expectation of the staff that the findings would be used. It is also an indication that the overall procedures were conducted properly.

The paper was brief in several areas. For example, there was considerable data not included by only reporting the top two needs in each category. Hopefully this data was not discarded as inservice programs were being developed.

Another area that is an illustration of brevity is in the Conclusions/Recommendations section. The overall usefulness of the study may be enhanced if this were lengthened. There are a couple of instances where the conclusions are unrelated to the objectives of the study.

Other studies of this nature are needed to further test the somewhat complicated procedure and to provide comparisons between the needs from region to region. It would be interesting to compare this and the follow-up studies to material developed at the national level.

HOW PRACTICING AGRICULTURAL EDUCATION TEACHERS VIEW PRE SERVICE COURSES WITH IMPLICATIONS FOR TEACHER EDUCATION REFORM

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INTRODUCTION

Many states are seriously considering significant changes in the way they prepare teachers. The idea for such change was started with the Nation at Risk report issued in 1983 which was quickly followed by other reports which looked specifically at teacher education reform.

The Holmes report (Tomorrow's Teachers, 1986) expressed displeasure with the generally low quality of teacher preparation in this country (Murray, 1986). The Holmes group was started by a group of college of education deans who desired (a) that education of teachers should be intellectually sound, (b) to recognize differences in knowledge, skill, and commitment among teachers, (c) to create honest standards of entry into the profession of teaching, (d) to connect schools of education with schools, and (e) to make schools better places in which teachers can work and learn (Murray, 1986).

The Carnegie Report (A Nation Prepared, 1986) was based upon recommendations from a task force composed of several leaders from industry, political circles, and education organizations. Among its recommendations were (a) Create a national board for professional teaching standards, (b) Restructure schools to provide a professional environment, (c) Restructure the teaching force including a category of lead teacher, (d) Require a bachelors degree in the arts and sciences as a prerequisite for the study of teaching, (e) Develop a new professional curriculum in graduate schools leading to a Master in Teaching Degree, (f) Mobilize the nation's resources to prepare minority youngsters for teaching, (g) Relate incentives for teachers to schoolwide student performance, and (h) Make teachers' salaries and career opportunities competitive with those in other professions (A Nation Prepared, 1986).

In 1986 Governor Gerald Baliles convened a special task force to examine the preparation of teachers in the Commonwealth of Virginia. Among its recommendations were (a) That teachers should not have undergraduate majors in colleges of education, (b) That future teachers should major in arts and sciences, (c) That education courses be limited to 18 semester hours, and (d) That pedagogical training should occur at the post baccalaureate level. (Excellence in Education, 1986).

With all the rush for change in teacher preparation, one group has not been quoted frequently -- practicing teachers. This is an opportune time to ask practicing teachers their opinions of the pre service program they completed. It was decided through this study to give such teachers the opportunity to evaluate pre service coursework in specific departments and colleges in relation to their teaching experience.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine Virginia agricultural education teacher perceptions regarding the value of undergraduate coursework preparation for their position as a teacher.

Specific objectives of the study were to:

1. Ascertain the value of undergraduate coursework to their position as a teacher of agricultural education.

2. Determine the value of undergraduate coursework by teaching specialty options in their position as a teacher of agricultural education.

3. Determine the value of undergraduate courses by years of teaching experience in their position as a teacher of agricultural education.

PROCEDURES

The study was conducted during the Fall of 1987 with the researchers administering instruments at area teachers' meetings. The instrument was researcher developed. It was validated by members of the agricultural education faculty at Virginia Tech, field tested with Virginia agricultural education teacher educators, and a class of undergraduate majors in agricultural education. Modifications were made in the instrument based upon the results of the field test. The instrument had a split-half reliability score of r = .83. The instrument asked certain demographic information and requested agricultural education teachers to rate 39 courses commonly taken in their preservice program. The courses were rated on a scale of 0 (no coursework), 1 (not valuable) to 4 (highly valuable). A total of 196 practicing teachers completed the instrument at the Fall area meetings. The researchers randomly selected 30 additional teachers who did not attend the Fall area meetings and sent each a copy of the instrument via the mail. Twenty-one teachers responded for a 70% response rate. Analysis of the data indicated no statistical differences between teachers who completed the instrument at the fall area meetings and those who did not attend, but completed the instrument via mail.

ANALYSIS OF DATA

Because of the purpose and objectives of the study and the type of data collected, the researchers used descriptive statistics. Means and standard deviations were determined for each category.

RESULTS

Table 1 indicates that the 217 Virginia secondary agricultural education teachers participating in this study rated college of agriculture (CALS) courses with a mean of 2.90 (4 = highly valuable). Coursework in the college of education was rated with a mean of 2.52, while courses in the college of arts and sciences had a mean rating of 2.15. When the college of education courses were subdivided into those taught by agricultural education faculty members and those taught by general education faculty a large difference in mean rating was noted with respective scores of 3.27 and 2.06.

Specific courses or groups of courses with similar content with the highest ratings were agricultural engineering (mechanics) ($\bar{x}$ = 3.69), student teaching ($\bar{x}$ = 3.49), animal science ($\bar{x}$ = 3.36), forestry ($\bar{x}$ = 3.20), and teaching methods ($\bar{x}$ = 3.15). Specific courses or categories of courses with the lowest ratings were music ($\bar{x}$ = 1.34), theatre arts ($\bar{x}$ = 1.63), foreign language ($\bar{x}$ = 1.67), philosophy ($\bar{x}$ = 1.68), and art ($\bar{x}$ = 1.70). Note Table 2.

While examining the course evaluations by teaching specialty options in Talbe 4, it was found that teachers in each respective option rated college of agriculture courses the highest. The scores ranged from a high of $\bar{x}$ = 3.02 for natural resources management teachers to a low of $\bar{x}$ = 2.85 for agricultural machinery service teachers. Other means included agricultural business (2.99), agricultural production (2.97), agricultural science and mechanics (2.92) and horticulture (2.92). College of education courses ranged from $\bar{x}$ = 2.85 for natural resources management teachers to $\bar{x}$ = 2.23 for agricultural business teachers. College of arts and sciences courses ranged from $\bar{x}$ = 2.45 for natural resources management teachers to $\bar{x}$ = 2.12 for agricultural science and mechanics teachers. Agricultural education courses ranged from a high of $\bar{x}$ = 3.38 for agricultural science and mechanics teachers to a low of $\bar{x}$ = 2.95 for agricultural business teachers.

Agricultural education teachers with 16-20 years teaching experience rated their college of agriculture courses highest with $\bar{x}$ = 3.12, while the teachers with the least experience (0-10 years) rated their college of agriculture courses lowest with $\bar{x}$ = 2.85. It should be noted that the teachers in the 16-20 year experience category also had the highest grand mean of the four groups.

CONCLUSIONS AND/OR RECOMMENDATIONS

Conclusions

1. Teachers of agricultural education rated the college of agriculture courses as valuable.

2. Teachers of agricultural education rated college of arts and sciences and college of education courses as less valuable than their college of agriculture courses.

3. Teachers of agricultural education rated agricultural education courses as more valuable than general education courses.

4. Small differences were found among ratings of courses by agricultural education teachers in different specialty options.

5. Small differences were found among ratings of courses by agricultural education teachers with varying years of teaching experience.

Recommendations

1. Results of this study should be considered when restructuring occurs for agricultural education teacher preparation programs.
2. Future agricultural education teacher preparation programs should have more college of agriculture courses than they presently contain.
3. Future agricultural education teacher preparation programs should have more agricultural education courses than they presently contain.

Table 1

Rating of Undergraduate Coursework by College

College	$\bar{X}$	SD
Agriculture and Life Sciences	2.90	.353
Education		
All Education	2.52	.719
Agricultural Education	3.27	.205
Other Education	2.06	.440
Arts and Sciences	2.15	.440

Note. Scale 4 = Highly Valuable to 1 = Not Valuable
Other education is all education less agricultural education

Table 2

Ratings of Courses or Groups of Courses

Highest Rated Courses	$\bar{X}$	SD	Lowest Rated Courses	$\bar{X}$	SD
Agricultural Mechanics	3.69	.59	Music	1.34	.55
Student Teaching (Ag Ed)	3.49	.69	Theatre Arts	1.63	.79
Animal Science	3.36	.72	Foreign Language	1.67	.77
Forestry	3.20	.70	Philosophy	1.68	.74
Teaching Methods(Ag Ed)	3.15	.77	Art	1.70	.87

Note. Scale 4 = Highly Valuable to 1 = Not Valuable

Table 3

Courses by College

Agriculture	Education	Arts and Sciences
Agricultural Economics	Agricultural Education	Art
Agricultural Mechanics	Educational Psychology	Biology
Agronomy	Health	Chemistry
Animal Science	Methods (Ag Ed)	Communications
Biochemistry and Nutrition	Physical Education	Economics
Dairy Science	Social Foundations	English
Entomology	Special Needs	Foreign Language
Fisheries and Wildlife	Student Teaching (Ag Ed)	Geography
Food Science Technology		Geology
Forestry		History
Horticulture		Math
Pathology		Music
Poultry Science		Philosophy
		Physics
		Political Science
		Psychology
		Sociology
		Theatre Arts

Table 4

Course Ratings by College and Teaching Speciality Option

Speciality Option	N	CALS $\bar{X}$	CALS SD	Education $\bar{X}$	Education SD	Agricultural Education $\bar{X}$	Agricultural Education SD	Other Education $\bar{X}$	Other Education SD	Arts and Sciences $\bar{X}$	Arts and Sciences SD
A	6	3.02	.42	2.85	.61	3.30	.43	2.52	.53	2.45	.74
B	13	2.99	.39	2.23	.73	2.95	.24	1.69	.32	2.26	.52
C	70	2.97	.40	2.56	.74	3.25	.24	2.04	.48	2.13	.45
D	80	2.92	.37	2.63	.75	3.38	.19	2.08	.39	2.12	.46
E	25	2.92	.46	2.72	.61	3.19	.17	2.37	.59	2.43	.45
F	20	2.85	.48	2.53	.70	3.20	.34	2.03	.37	2.22	.54

Note. Teaching speciality options: A = Natural Resources Management,
B = Agricultural Business, C = Agricultural Production,
D = Agricultural Science and Mechanics, E = Horticulture and
F = Agricultural Machinery Service
CALS = College of Agriculture and Life Sciences
Scale 4 = Highly Valuable to 1 = Not Valuable

Table 5

Course Ratings by Years of Experience

Years of Experience	CALS $\bar{X}$	CALS SD	All Education $\bar{X}$	All Education SD	Agricultural Education $\bar{X}$	Agricultural Education SD	Other Education $\bar{X}$	Other Education SD	Arts and Sciences $\bar{X}$	Arts and Sciences SD
0 to 10	2.85	.34	2.57	.74	3.29	.22	2.03	.41	2.12	.43
11 to 15	2.92	.40	2.57	.76	3.25	.30	2.05	.52	2.12	.46
16 to 20	3.12	.39	2.67	.68	3.27	.13	2.22	.53	2.37	.54
Over 21	3.01	.40	2.62	.68	3.27	.16	2.14	.41	2.22	.42

Note. CALS = College of Agriculture and Life Sciences
Other education = all education less agricultural education

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How Practicing Agricultural Education Teachers View Pre Service Courses With Implications for Teacher Education Reform
A Critique

Vernon D. Luft, North Dakota State University--Discussant

The purpose of this study was to determine Virginia agricultural education teacher perceptions regarding the value of undergraduate coursework preparation for their position as a teacher.

Strengths of the Study

The rationale and theoretical framework for the study were clearly described. Research procedures were sound, and appropriate instrument validation and reliability measures were employed. The follow-up procedure as well as the descriptive statistical measures were appropriate for this study. This report is well written; it is organized, easy to understand, and contains clearly labeled tables in which data are well presented.

Areas to Strengthen

1. A total of 196 teachers attended the meetings and completed questionnaires, and an additional 21 out of 30 randomly selected teachers who were not at the meetings also returned questionnaires in the follow-up process. What portion of the total number of teachers in Virginia does this 217 represent?

2. According to the AATEA Directory, Virginia has two institutions which prepare agricultural education teachers and likely has some teachers who graduated from institutions outside the state. Was any attempt made to categorize the respondents accordingly so that responses might be institution specific?

3. The first recommendation states, "Results of this study should be considered when restructuring occurs for agricultural education teacher preparation programs." Specific examples should be provided to clarify what the authors are recommending. Are you suggesting that arts and science courses should be eliminated from the teacher preparation program because they were rated having the least value, or that the arts and science courses students are presently taking could be taught better so as to have more value? I find it difficult to believe that these courses could be either eliminated or reduced in number in a university setting.

4. The remaining two recommendations suggest that the agricultural education teacher prepraration programs should include more college of agriculture courses than they presently contain. This may relate to the findings of the study, but it would be difficult to accomplish. Course structuring to meet university requirements, accreditation standards, and university politics may prohibit implementation of these recommended changes.

The authors are to be commended for conducting an interesting and timely study. You might answer this question: How do the findings and recommendations of your study correspond to the recommendations of the Excellence in Education report noted in your paper?

IMPACT OF TEACHER PERSONALITY ON CLASSROOM ENVIRONMENT

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INTRODUCTION

How can student learning be increased? This is a question on the minds of many policy makers today. This is not a new question but it is one to which answers come slowly. If vocational education is to deflect some of its critics, answers to this question needs to be found in vocational classrooms.

A positive classroom environment is increasingly being accepted as one way to measure teaching effectiveness, and effective teachers' students learn more. Overall, teacher-student agreement on the most desirable classroom climate varies. Both teacher and student want much more emphasis on involvement, affiliation, teacher support, organization, and innovation and much less competition than they have in their classes. However, teachers want somewhat more task orientation and control, whereas students want somewhat less (Moos, 1987).

In a study by Trickett, et. al, 1985, vocational classes were found to be the lowest in teacher support and innovation and the highest in competition, clarity, and teacher control.

PURPOSE AND OBJECTIVE

How to increase positive classroom environments is the problem this study addressed. To find answers to this problem the following hypothesis was tested:

> -There is no relationship between a teacher's personality and the classroom environments they create, as perceived by students.

PROCEDURES

The population for this study consisted of secondary high schools within 150 miles of Lincoln, Nebraska which offer vocational agriculture. Seven schools were randomly selected. The sample consisted of 34 vocational teachers and 638 vocational students in 9th or 10th grades.

The teachers administered the Myers-Briggs Type Indicator (MBTI) Form G and the Stern Classroom Environment Index (CEI). Both instruments have been widely used in research. The MBTI has a reliability mean of .80 on eight scales and the CEI .64 on 30 bipolar or single subscales.

The MBTI measures the psychological type constructs of Carl Jung and Isabel Myers and consists of four dichotomous scales of extraversion (E)-Introversion (I), Sensing (S)-Intuitive (N), Thinking (T)-Feeling (F), Judging (J)-Perception (P). The CEI is designed to measure the psychological environment of the classroom; it produces 30 subordinate scales, 6 first order scores, and two second order scores. The page limit of this paper does not allow for scale definition of the CEI , see Myers (1987) and Richman (1979) for more complete discussion and definitions. Analysis of the data was done by using analysis of variance and Fischer's protected least significant difference (LSD) tests.

RESULTS

The hypothesis that there is no relationship between a teachers personality and the classroom environments they create, as perceived by students was rejected. Significant differences were found between teacher personality as measured by the MBTI and 23 of 30 CEI subscales in Table 1. Only subscales that are significantly different were reported in Table 1.

The first bipolar subscale of the Classroom Environment Index (CEI) Supplication-Autonomy was significantly different for all 4 Myers-Briggs Type Indicator (MBTI) dichotomous scales. Teachers who were introvert (I), intuitive (N), thinker (T), and judging (J) created environments high in supplication. This is an environment where people depend on one another for emotional support, assistance and protection. Whereas, teachers who were extraverted (E), sensing (S), feeling (F) and perceptive (P), created environments more positive or autonomous. These are environments which encouraged self-reliance.

This finding is consistent with personality type theory. Introverted, intuitives, thinking, judging teachers are known to be hard drivers who use a limited amount of positive feedback to students. As a result, their students, especially those who are shy and reserved, may feel threatened. However, their psychological opposites, the extraverted, sensing, feeling, perceptive teachers are known for their conveyance of affect that is warm and friendly which may build self-reliance.

The second bipolar subscale of the CEI was significantly related to 3 MBTI scales. Extravert (E), sensing (S) and feeling (F) teachers created environments high in deference. This is an environment where a strong consciousness of rank exists. Their opposites, the introverts (I), intuitives (N) and thinking (T) teachers had environments high in restiveness this is where rank for its own sake was not strongly acknowledged, but rebelliousness and gaminess may be enjoyed.

Congruency with type theory is consistent with this finding. Extravert (E), sensing (S), feeling (F), teachers usually require that students respect their authority as teacher and insist on being addressed as Mr. or Mrs. This is especially true of the ESFJ teacher which represented 15% of this sample. The introvert (I), intuitive (N), thinking (T) teacher is usually more non-conformist with little deference to rank. They have a more wider definition of respect.

The CEI scale change-sameness was significantly related to 3 MBTI scales. Teachers who scored as extravert (E), feeling (F) and perceptive (P) on the MBTI created environments perceived by students to be change oriented. These are environments where both variety and change are expected and accepted as a given aspect of the surroundings. Teachers who were introverts (I), thinking

Table 1

Classroom Environment And The Instructor's Teaching Style
By Components Of Personality Type As Perceived By Students

Classroom Environment Scales	Teacher's Personality Component							
	E	I	S	N	T	F	J	P
	N=21	N=13	N=28	N=6	N=21	N=13	N=30	N=4
Supplication-Autonomy	4.3	4.6*	4.3	4.8	4.5	4.2	4.5	4.0
Deference-Restiveness	5.9	5.6	5.9	5.4	5.7	6.0		
Change-Sameness	5.0	4.7			4.8	5.1	4.9	5.2
Conjunctivity-Disjunctivity			7.3	6.5	7.0	7.4	7.1	7.6
Counteraction	5.7	5.0			5.3	5.7	5.4	5.8
Nurturance	5.4	4.9			5.0	5.6	5.1	5.7
Adaptability-Defensiveness	5.5	5.1	5.3	5.8				
Exhibitionism-Inferiority Avoidance	4.6	4.9					4.8	4.5
Objectivity-Projectivity	5.1	5.4					5.1	5.5
Play-Work			5.1	5.5			5.1	5.5
Reflectiveness					5.6	5.9	5.7	6.0
Group Intellectual Life					36.1	37.2	36.4	37.6
Personal Dignity	33.2	32.4	33.1	32.1	32.7	33.4		
Developmental Press					126.9	129.4	127.3	130.5
Students:	n=433	n=205	n=551	n=85	n=393	n=243	n=525	n=111

Note: *The mean scores are student perceived scores. All scores reported are significantly different at the .05 level, CEI subscales with less than four different personality type components were not reported. Follow-up using Fisher's protected least significant difference test.

For interpretation of pairs of mean scores, the highest mean score refers to the CEI scale on the left, and the lower mean score refers to the CEI scale on the right. Scores for single word CEI scales refer to that word.

(T) and judging (J) had environments more oriented to sameness, one geared to routine and convention, where little change takes place over the years.

This result reinforces the type characteristic of the E, F, P teacher. Extravert (E) feeling (F) and perceptive (P), these teachers are known for action and variety - a "surprise a minute" whereas, the Introvert (I), thinking (T), judging (J) teachers are known for stability and consistency of how the classroom is being run. This is most true for the ISTJ type which represented 21% of the teaching sample.

The CEI subscale, conjunctivity-disjunctivity, was significantly related to 3 dichotomous MBTI scales. Teachers who were sensing (S), feeling (F), and perceiving (P) scored high in conjunctivity, this is an environment high in organization and efficiency. Intuitive (N), thinking (T), and judging (J) teacher's scores reflect the development of an environment of disjunctivity one which keeps students off balance because of its disorganized and rambling nature.

At first glance this finding seems to be inconsistent with type theory in that S,F,P teachers should be the most disorganized, but when one considers the high number of sensing students (551) in these classrooms they would identify intuitive-thinking teachers as disorganized. This may be due in part to the sensing students difficulty in "tracking" intuitive teachers who conceptualize globally.

The CEI subscale, counteraction, was related to 3 MBTI scales. E, F, P teachers had classroom environments higher in counteraction than did I, T, J teachers. High scores in counteraction represents an environment which encourages individuals to take challenges and be critical of other's decisions which affect them.

It appears that these results indicate that the more open teaching style of E, F, Ps is more conducive or less threatening to students and they can be free to take challenges. The opposite would be true for I, T, J teachers. Their behavior, at least in this sample, seems to inhibit the willingness of students to take challenges.

The CEI subscale nurturance was also related to 3 MBTI scales. As in the counteraction scale, E, F, P teachers were high and I, T, J teachers low. E, S, P teachers had environments that were perceived by students to be warm, friendly and those in which newcomers are welcomed and helped. I, T, J teachers classrooms appeared to be less friendly.

This finding is not inconsistent with type theory in that E, F, Ps appear to be more friendly at least at first glance, while I, T, J teachers have a tendency to be more distant.

The CEI subscales adaptability - defensiveness was related to Extraversion-Introversion and sensing-intuition. Extraverted, intuitive teachers were perceived to have classroom environments higher in adaptability, while introverted sensing teachers had classrooms that were characterized as defensive. In adaptable classrooms, students learn to deal with criticism of others and the evaluation of their own actions. Defensive classrooms reflect a more tolerant attitude toward human error.

Both of these findings are predictable with personality type theory. Extraverts tend to "speak their mind" and may seem more critical than introverts. Intuitives have a tendency to question and ask why. They often have high standards of student expectation, while sensing teachers may be more willing to accept error as natural.

The MBTI scales of E-I and J-P were significantly different for the CEI scales of exibitionism and inferiority avoidance. Classrooms of introvert and judging teachers were higher in exibitionism than extravert and perceptive teachers. Inferiority avoidance was perceived to be exibited in the classrooms of extravert and perceptive teachers. Classrooms that are exibitionist encourage students to draw attention to themselves, while inferiority avoidance classrooms are the opposite - marked by personal privacy. The reasons for this result may be because the I-J teacher requires so much silence and structure that the majority of students, who are extraverts and sensing, "act-up" in the classroom.

MBTI scales E-I and J-P were different for the environment scale of objectivity and projectivity. Introverted and perceptive teachers had environments high in objectivity, whereas their opposites, the extraverted judging types classrooms were more projective.

Classrooms high in objectivity are marked by student confidence in assessing situations objectively, while projective classrooms are marked by distrust, subjectivity and uneasiness. Personality type theory would suggest that this finding would be predictable. I-P teachers tend to be more relaxed than E-J types, thus creating environments where evaluation is less threatening.

The play-work subscales of the CEI were significantly related, to the MBTI scales of S-N and J-P. Play climate is an environment characterized by a nonchalant attitude toward work, while the work climate is task oriented.

Intuitive perceptive teachers developed environments that appeared to be less task oriented and more play while sensing, judging teachers had the opposite.

Personality type theory would suggest that the S-J teacher is more task oriented and the N-P less so, therefore this finding is in strong agreement.

The reflectiveness subscale of the CEI was related to T-F and J-P. Reflective classrooms are those which encourage introspection, contemplation or preoccupation with private thoughts. F and P teachers had climates higher in reflectiveness than did T-J teachers. The tendency of T-J teachers to be task oriented leaves little time to be reflective.

There were 12 other subscales of the classroom environment index that were significantly related to personality type components but were not reported because of lack of significance on more than one MBTI bipolar scale.

The classroom environment index (CEI) also has area scales in which subscales have been combined; these are on the bottom of Table 1.

Group intellectual life was related significantly to the T-F and J-P scales. This scale reflects an overall relationship to intellectuality, reflectiveness, objective thinking and practicality as a measure of classroom environment. F-P teachers scored highest and T-J less.

This is an agreement with type theory in that feeling-perceptive teachers create a warmer less threatening climate than would the thinking-judging teachers, thus the T-J teacher's classroom climates appear to be less conducive to group intellectual life.

Personal dignity as a area score was related to E-I, S-N, T-F personality components. Classroom climates high in personal dignity are characterized by tolerance, self-confidence and friendliness. E, S, F teachers scored highest and I, N, T teachers the lowest.

This finding is quite consistent with personality type theory in that the extraverted feeling types project a friendly atmosphere and the introverted thinking teachers less so.

Developmental press is the last CEI area score to be reported. Classrooms high in this combined factor emphasize intellectual achievement, personal development, warmth and respect as opposed to a more institutionalized environment. The T-F and J-P scales were significantly related. F-Ps scored higher and T-Js lower. This finding is consistent with the findings for the other two area scores.

CONCLUSIONS/IMPLICATIONS

Results of this study strongly suggests that a teacher's personality has an effect on the nature of classroom environments as perceived by these students. Whereas, a teacher has no control of student intelligence and how much students learn as a result, they do have control of the environment they create in the classroom and the resultant effect on student learning. It has long been recognized by teacher educators that certain teachers created environments not conducive to learning, but what to do about it was not always clear.

By understanding personality type theory, teachers at all levels can begin to understand cause and affect in the classroom and begin to diagnose and analyze teaching behaviors that both decrease and increase learning.

Examination of the combined area scores suggests that T-J teachers convey messages to students that may be less than positive to classroom climates. If, in fact, this is true for some T-J teachers, this information could be helpful in designing teaching strategies and affect behaviors that convey a different message to students. This is especially important because 62% of this sample of vocational teachers are thinking types.

The data also suggests that each component of personality type may have an effect on classroom climate both negatively and positively. Overall, Extraverted, Sensing, Feeling, and Perceptive factors were more frequently linked to positive classroom environments and Introverted, Intuitive, Thinking and Judging factors less. This information, if understood and used could help vocational teachers and administrators and teacher educators who are attempting to improve teaching effectiveness behavior.

This study clearly indicates that through diagnosis of teaching behaviors, identified by personality type, one can begin to predict outcomes in classroom environments. With clinical type data, recommendations can be made to pre-service and in-service teachers about improving their teaching effectiveness in less subjective ways. This kind of information can also provide a theoretical basis for practice. It provides some clues as to why suggested recommendations to improve teaching behavior works for some teachers and fails for others.

Results of this study indicate that the dynamics of classroom behavior created by teachers is far more complex than sometimes realized. If any substantial improvement are to be made in improving teacher effectiveness, attention needs to be focused on fundamental scientific principles of teacher and student interaction.

RECOMMENDATIONS

1. Vocational educators should learn to use classroom diagnostic instruments as measures of teaching effectiveness.

2. Teacher educators should use personality type indicators to assist pre-service and in-service teachers to diagnose both positive and negative teaching behaviors.

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IMPACT OF VOCATIONAL AGRICULTURE/FFA ON COMMUNITY LEADERSHIP

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INTRODUCTION

Leadership development has long been claimed as a goal and product of the vocational agriculture program. In fact, one of the six objectives of Vocational and Technical Education in Agriculture is "to develop the abilities needed to exercise and follow effective leadership in fulfilling occupational, social, and civic responsibilities" (Objectives ..., 1976). The Future Farmers of America (FFA) organization, an integral part of the vocational agriculture core of instruction, is used to provide leadership training and realistic leadership experiences for students involved in vocational agriculture.

The success of this leadership development effort in vocational agriculture should be reflected within the community leadership. Evidence of such an impact would include the number of former students recognized as providing leadership within their communities and their perception of past involvement in vocational agriculture. Is vocational agriculture/FFA actually training for leadership? The success of many former members who are now in positions of high leadership seem to indicate that it is. Surveys have found an impressive number of former members serving as local, state, and national leaders. These leaders with vocational agriculture/ FFA backgrounds include former President Jimmy Carter, senators, representatives, governors, astronauts, broadcasters, magazine editors, leaders in education, and, naturally, many important community and farm organization leaders. (Lesson in Leadership,1965; Carter, 1977; Wilson, 1983; Pritzker, 1982; Stagg, 1986)

Although other research studies (Carter and Townsend, 1983; Arrington, 1985; Iverson, 1980) have shown that the leadership trait is enhanced with vocational agriculture/FFA training, there has been very little research conducted to determine the number of people involved in community leadership who participated in and/or completed the vocational agriculture program.

This study was undertaken as part of a western regional vocational agriculture impact research project. Traditionally, vocational agriculture educators have used an employment follow-up to evaluate the effectiveness of their program. However, the employment follow-up does not adequately evaluate the impact of vocational agriculture programs on community leadership. Because of this fact, an impact study was needed to evaluate the effect that vocational agriculture programs have on leadership roles in a community.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine the impact vocational agriculture programs have had on community leadership.

In order to better comprehend and accomplish the purpose of this study, the following objectives were formulated:

1. To determine the status of community leaders with regard to age, sex, occupation, educational level, participation in community activities and other demographic data.
2. To determine what factors community leaders consider to have contributed the most to their success.
3. To determine the community leaders degree of participation in vocational agriculture.
4. To ascertain the community leaders perceptions regarding the leadership experiences obtained in vocational agriculture.
5. To compare the level of involvement in selected community activities of former vocational agriculture participants and nonparticipants.

PROCEDURES

The instrument used to collect the data was a revision of the instrument which evolved from the Western Regional Impact Study. The instrument was divided into two parts. After the instrument was formulated, changes suggested by the Agriculture Education staff of Oklahoma State University were made and a pilot test was conducted in the researcher's home community.

Prior research has shown that regardless of the method of identification used, the results will produce basically the same list of leaders (Preston, 1969; Hawley and Wirt, 1968). As a result of the review of literature, it was decided that a combination of leader identification methods would be used. The positional method was used to identify those leaders who were in positions of authority and these leaders were in turn asked to identify other persons whom they considered to be community leaders. This was done to include those opinion leaders who might operate "behind the scenes". The results of this approach were used to develop the list of community leaders included in the study.

Six communities with schools having vocational agriculture departments - five single teacher and one multi-teacher (approximately the state proportion of single vs. multi-teacher departments)- were randomly selected from each of the five vocational agriculture supervisory districts in Oklahoma. This resulted in a total of 30 communities being included in the study. Vocational agriculture instructors were used to provide the list of positional leaders. They were asked to select the most widely recognized leader in each of the nine identified areas- agriculture, business, communications, education, government, industry, professional, religion, and civic groups. These areas were selected, based on the review of literature, to obtain a representative cross-section of the community and prevent biasing the study with agriculture leaders. All 30 or 100% of the vocational agriculture teachers responded. Results of this survey produced the names and addresses of 255 community leaders. These leaders were sent a cover letter describing the project, a questionnaire, and a sheet asking for them to provide a list of not more than ten individuals whom they considered to be the community leaders. After a follow-up postcard and a second mailing, 132 responses were received for a 52% return. After tabulation of their responses, 471 additional community leaders were identified and included in the study. Questionnaires were sent and after a postcard follow-up, 237 of these individuals returned questionnaires for a 50% return rate. This overall procedure produced a total of 726 community leaders of which 369 responded for an overall response rate of 51%. A random telephone follow-up of 10 percent of the non-respondents and a subsequent Chi Square statistical test revealed no significant differences from the previous respondents in demographic data, participation in community groups, or the percentage of vocational agriculture participants.

ANALYSIS OF DATA

Descriptive statistics were used to analyze specific demographic data. Values were calculated for the appropriate statistic. The perceptions obtained from the community leaders about the factors contributing to their leadership skills and their vocational agriculture/FFA leadership experiences were measured on a five point continuous scale. The scale was designed so that the perceptions could be rated on a scale of one to five; one signifying no influence and five indicating great influence. In order to compare the level of involvement in community activities of vocational agriculture participants and nonparticipants, all respondents were queried about their participation in community groups during the past two years. Eight groups were identified: (1) civic, luncheon, and service clubs, (2) chamber of commerce, (3) community affairs organization, (4) school organizations, (5) political organizations, (6) church groups, (7) agricultural groups, and (8) educational groups. Summated scales were constructed to measure the number of organizations and groups to which the community leaders belonged (scope) and their levels of participation (intensity). For each group, respondents were given, respectively, a score of one if they were a member, a score of two if they were a committee member, and a score of four if they were an officer. These values were then summed to produce a range of odd-numbered scores from 0 (no participation) to 7 (a member who served as a committee member and an officer). An overall community leadership score was then calculated by adding the individual group scores. This produced a possible scale of values ranging from 0 to 56. To compare the participants and the non-participants community involvement scores, a T-test with an alpha level of .05 was conducted.

After each of the eight scales were constructed, their reliability was tested by Cronbach's alpha (1951). This reliability procedure measured the internal consistency of scale items. These reliabilities ranged from .85 to .77.

RESULTS

Objective 1: Demographic Data

The background characteristics of the community leaders identified are reported in Table I.

Objective 2: Factors Contributing to Success of Community Leaders

All of the leaders were questioned about their perception of how a list of factors had contributed to their success as a community leader. They were asked to rate each factor on a five point continuous scale by checking none, little, some, much, or great. If they were not involved in a particular factor they were instructed to check none. This was done so as an "overall" rating among all community leaders of how much each of the factors had contributed could be determined. The ratings of each of these factors is presented in TABLE II. The most often mentioned "Other Youth Organizations"

Table I
BACKGROUND CHARACTERISTICS OF COMMUNITY LEADERS
(n=369)

Age:		Occupational Status:	
mean-	46.5 years	Business-	28%
median-	44 years	Agriculture-	17%
mode-	38 years	Education-	14%
Sex:		Professional-	10%
male-	89%	Government-	10%
female-	11%	Retired-	8%
Ethnic Origin:		Religion-	4%
white-	98%	Communications-	3%
other-	2%	Other-	2%
Educational Level:			
<12 years-	2%	Agriculture Interests:	
12 years-	19%	Yes-	43%
Some college-	19%	No-	57%
B.S. or higher-	60%		

Table II
Respondents' Mean Ratings of Factors Contributing to their Success as Community Leaders

	MEAN RATINGS(1)		
FACTORS (2)	VO-AG PARTICIPANTS (n =162)	NON-PARTICIPANTS (n = 209)	TOTAL (n=369)
Learned from other individuals	3.78	3.78	3.78
High School	3.71	3.36	3.51
College	3.54	3.16	3.33
Self-taught	3.27	3.29	3.28
Professional Organizations	3.03	3.13	3.08
Vocational Agriculture	3.98	1.36	2.51
Other Youth Organizations	2.18	2.04	2.10
4-H Club	2.58	1.68	2.08
Military	2.08	2.00	2.04
Other	1.60	1.52	1.55
Vocational-Technical School	1.72	1.32	1.50

(1) None = 1; Little = 2; Some = 3; Much = 4; Great = 5.
(2) Those not involved in a particular factor checked none.

were Athletics and Church Youth groups. The most often "Other" factors mentioned were Church and Job.

A focus on Vocational Agriculture as a contributing factor to community leader success revealed a mean rating of 3.98 with 63 (17%) leaders indicating that it had a great impact and 58 (16%) indicating that it had much impact. It was interesting to note that 42 (20%) of the leaders who were not themselves enrolled in Vo-Ag indicated that it had contributed either little, some, much or greatly to their success as a leader. Many of these leaders stated that serving as contest judges, award sponsors, advisory committee members and participating in other activities of the program had been of help to them.

Objective 3: Degree of Participation in Vocational Agriculture

One of the main objectives of this study was to determine the number of community leaders who had participated in Vocational Agriculture. One hundred sixty two (44%) of the community leaders responding indicated that they had been enrolled in Vocational Agriculture. Upon further scrutiny, it was found that none of the females had been involved. With the females excluded, 49% of the males were enrolled. Further data on the participation of the community leaders is presented in TABLE III.

Table III
Respondents' Degree of Participation in
Vocational Agriculture/FFA

Participation:		Activities	
Yes-	44%	Judging contests-	84%
No-	56%	Fairs and shows-	82%
Years of Enrollment in Vo-Ag:		Chapter banquet-	77%
4 years-	70%	Committee work-	59%
3 years-	12%	Parliamentary Proc.-	58%
2 years-	9%	State Convention-	54%
1 year-	8%	Community Service-	53%
FFA Membership:		Public Speaking-	49%
4 years-	67%	Proficiency Awards-	43%
3 years -	12%	Creed Speaking-	38%
2 years-	11%	National Convention-	19%
1 year-	7%	Leadership Camp-	12%
> 4 years-	3%	BOAC Projects-	7%
Highest Degree:		Food for America-	3%
Chapter Farmer-	47%	Soph. Motivat. Conf.-	3%
State Farmer-	29%	Washington Lead. Conf-	1%
Greenhand-	21%		
American Farmer-	3%		
Highest Office:			
Chapter Office-	71%		
State Office	4%		
No Office	25%		

Objective 4: Perceptions Regarding Leadership Experiences Obtained in Vocational Agriculture

The leaders were asked to respond on a five point continuous scale (ranging from none to great) to a series of 11 statements about the leadership experiences obtained in Vo-Ag/FFA. Results of their perceptions are presented in TABLE IV. Eight of the statements were rated in the "much" category range while the other three were rated in the "some" category.

Table IV
Ratings of Extent to which Vocational Agriculture/FFA
Activities contributed to Participants'
Leadership Development
(n=162)

Leadership Training Experiences in Vo-Ag/FFA:	Mean(1)	S.D.
Taught you how to participate in and conduct meetings	3.93	1.02
Have been of value in your career	3.90	1.17
Helped you in developing leadership skills	3.74	1.05
Prepared you for assuming leadership roles	3.63	1.06
Help you in your present occupation	3.62	1.26
Gave you the opportunity to lead others	3.60	1.13
Helped you become a more effective community leader	3.58	1.04
Influenced you to participate in community activities	3.51	1.07
Influenced your decision to become a leader	3.44	1.17
Involved you in planning club activities	3.40	1.07
Helped you in obtaining a job	3.16	1.40

(1) None=1; Little=2; Some=3; Much=4; Great=5.

Objective 5: Comparison of Degree of Involvement in Community Activities of Vocational Agriculture/FFA Participants and Non-Participants

Overall, on the mean summated scale scores presented in TABLE V, vocational agriculture participants had a higher degree of involvement in

TABLE V
MEAN SCALE SCORES OF COMMUNITY INVOLVEMENT

ACTIVITY	VO-AG PARTICIPANTS (n=162)	NON-PARTICIPANTS (n=209)	t value	prob.	
Civic Activities	3.65	3.51	.43	.664	
Chamber of Commerce	2.05	2.62	1.94	.053	
Community Affairs Org.	2.77	2.13	2.12	.035	*
School Organizations	2.01	0.92	4.19	.0001	*
Church Group	3.90	3.10	2.55	.011	*
Political Organizations	1.35	1.12	0.95	.341	
Agricultural Groups	2.81	0.64	8.17	.0001	*
Educational Groups	2.10	0.74	5.53	.0001	*
TOTAL	20.70	14.80	5.85	.0001	*

* Indicates groups are significantly different at a=0.05

community activities than non-participants. Specifically, vocational agriculture participants were more involved in community affairs organizations, school organizations, church groups, agricultural groups, and educational groups. Also, their total community activities scores, based on each of the group scores put together, were significantly higher.

CONCLUSIONS

In this study, vocational agriculture/FFA was found to have had an impact on the success of many community leaders. Almost half of the leaders surveyed were past participants in the program. The typical leaders who were enrolled in vocational agriculture were presently residing in the same community of enrollment, had been enrolled in all four years of the program and had been a member of the FFA for four years. During these years, they had received an advanced degree and had served as a chapter officer. More than likely, they had participated in judging contests, fairs and shows, chapter banquets, committee work, parliamentary procedure, state conventions, and community service activities.

Community leaders surveyed who had participated in vocational agriculture felt that their leadership activities were effective in developing their leadership skills, contributed much to their success, and have been of value in their careers regardless of occupation. Surprisingly, it was found that twenty percent of those who had not been enrolled in vocational agriculture indicated that, through adult involvement, it had contributed to their success. This is evidence of just one of the contributions that vocational agriculture programs make to their local communities

The vocational agriculture/FFA leadership development program contributes notably to community groups and organizations. Past vocational agriculture participants not only serve as members in these community organizations but are more likely than non-participants to serve in a leadership capacity.

Does it work? Is vocational agriculture and FFA actually training leaders? To answer this question one has only to observe and review the records of former participants who are making good as leaders in their home communities. The answer is obvious- IT WORKS!!

RECOMMENDATIONS

Vocational agriculture educators should continue to publicize the fact that the Vocational Agriculture/FFA program provides benefits to people in all walks of life and is of particular importance in the development of community leadership.

In addition, they should continue to stress and expand the leadership development portion of their programs. Significant attention should be given toward the motivation of students to participate in, and become involved with, leadership activities. Local community leaders should continue to be involved in vocational agriculture as resource persons, judges, advisory groups, etc., and encourage as much contact as possible between those leaders and current students due to the documentation that other individuals are valuable sources of leadership development.

Critics and evaluators of the vocational agriculture program should continue to look beyond occupational titles and consider additional benefits such as leadership development. This methodology can, and in some cases should, serve as an alternative to the traditional student follow-up evaluation.

Due to the increased number of females enrolled in vocational agriculture, this study should be replicated when enough time has past that the influence of vocational agriculture on female community leaders can be measured. Further research should be conducted to follow-up on this effort and document the impact of vocational agriculture on the individuals, schools, and communities involved.

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Impact of Vocational Agriculture/FFA on Community Leadership
A Critique

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Traditionally, vocational agriculture has based its instruction on the opportunities in the local community. For the most part, opportunities have been defined in terms of entry level employment. It is enlightening to read a study such as this one that focuses on how vocational agriculture has contributed to community leadership.

An extensive review of literature enabled the authors to develop a sound theoretical framework for their study. The purpose and objectives of the study were written concisely. Appropriate procedures were followed in developing the instrumentation as the authors controlled for measurement error. A strength of the study is the use of instrumentation that has already been validated. Even with minimal revisions in the instrumentation, the authors were careful to reestablish content validity and reliability. A logical procedure for calculating scale scores was clearly explained. Items selected for the instrumentation were derived from the literature.

The population of the study apparently included all Oklahoma communities. As a reader, I would like to know the rationale for selecting six communities from each supervisory district. The communities were randomly selected which helped reduce researcher bias. In order to know more about how the authors controlled for frame error, the source or list of the communities should be noted. A three step process for identifying leaders was productive. For this type of study, a 51% return rate is respectable especially in view of the fact that the authors obtained 369 respondents, conducted follow-up procedures and controlled non-response error through their telephone survey to non-respondents.

The study was descriptive in nature. The researchers were careful not to statistically exceed their bounds and conducted an appropriate analysis of the data. Presentation of data was enhanced as the tables were helpful to reader interpretation of the major findings. The authors should follow APA (Third Edition) style for publication purposes. The authors have numerous opportunities for further analysis of their data. The authors are careful not to state cause and effect. However, with further analysis and control of extraneous variables, more substantial claims may be made.

Conclusions and recommendations were based on the findings of the study and clearly stated. While numerous other experiences contributed to leadership development, it was interesting to know that vocational agriculture leadership experiences influenced community leaders who were not program graduates. This study empirically supports the assumption that FFA leadership development benefits students and the communities in which they live as the graduates with agricultural leadership experience are likely to be leaders in other organizations.

Congratulations to the authors for conducting a well organized study and for presenting a well written paper. They have contributed to the profession by providing others with a methodology for investigating leadership program effectiveness. Hopefully, the authors will continue to assess the outcomes of their leadership program as community dynamics and agricultural education programs change.

INTEGRATING BIOLOGY AND AGRICULTURE: EFFECTS ON STUDENT ACHIEVEMENT AND ATTITUDES

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INTRODUCTION

Secondary vocational agricultural education may well be in its most tenuous position since its inception more than half a century ago. Program enrollments have dwindled, programs have been cut back or discontinued, and teaching positions have been terminated. Agricultural educators have been searching for a way to stem this tide which some feel is leading inexorably toward the demise of secondary vocational agriculture.

The strategy which seems to have gained the most support from agricultural educators, one which is offered for vocational education in general, is summarized by the National Commission on Secondary Vocational Education (1984).

> *What is really required today are programs and experiences that bridge the gap between the so-called "academic" and "vocational" courses. The theoretical and empirical bases as well as the practical and applicative aspects of academic courses and vocational courses must be made explicit and meaningful. (p. 14)*

Many agricultural educators have lined up in support of this type of approach, particularly in regard to the integration of science and agriculture in secondary programs (Case, 1986; Bowen, 1986; Schuh, 1986).

Evidence also exists that this integrated approach could benefit science education as well. The National Science Board Commission on Precollege Education in Mathematics, Science, and Technology (1983) reported an "urgent need" for curricula which utilize science and mathematics applied in practical situations to improve learning and stimulate interest.

The problem is a lack of systematic and purposeful integration of agriculture and the underlying principles of biology upon which much of agriculture is based. Moreover, though it has become a popular cause, very little empirical evidence exists to support the notion of integrating agriculture and science.

PURPOSE AND OBJECTIVES

The purpose of this study was to determine how well two disciplines, agriculture and biology, may be integrated in a high school agriculture setting. This purpose was accomplished by testing the effect of the incorporation of biological principles instruction into a unit of instruction in vocational agriculture on student achievement and attitudes. The specific objectives of the study were:

1. To identify the principles of biology which could feasibly be introduced into secondary agriculture instruction, and to develop a curricular plan for teaching these principles in an agricultural problem area.

2. To compare the overall achievement and applied biology achievement level of students taught using the integrated approach with those of students taught using a traditional curriculum.

3. To compare attitudes toward the curricular plan used of students taught using the integrated approach with those of students taught using a traditional curriculum.

In order to complete objectives two and three, the following hypotheses were tested:

$H0_1$: No significant difference in overall achievement will exist between students taught using the integrated approach and those taught using a traditional approach.

$H0_2$: No significant difference in applied biology achievement will exist between students taught using the integrated approach and those taught using a traditional approach.

$H0_3$: No significant difference in attitude toward the approach used will exist between students taught using the intagrated approach and those taught using a traditional approach.

PROCEDURES

Research Design

Since intact vocational agriculture classes were used for this study, random assignment of subjects to groups was impossible. Therefore a pretest-posttest control group quasi-experiment was chosen. The treatment consisted of the use of experimental teaching plans and materials for the selected problem area. The treatment was assigned randomly to one-half of the selected sample classes.

Variables

The dependent variables in this study were overall student achievement, as measured by overall score on a problem area achievement test, student achievement in applied biology, as measured by scores on a subset of "applicative" test items, and student attitude toward the teaching plan used, as measured by a student attitude scale.

The variable "applied biology achievement" bears further explanation. An underlying assumption of this study was that agriculture is, in large part, based upon some principles of biological science. The intent, then, was to measure the students' ability to apply certain principles of biology in order to solve practical agricultural problems, rather than to measure their knowledge of straightforward biology content. This is the key to the integration of biology and agriculture which was the primary purpose of this study.

The primary independent variable investigated was the use of the "integrated approach" teaching plans. The students in the treatment group were taught using the integrated approach plans, while those in the control group received traditional instruction which did not emphasize the application of biological principles. In addition, the student variables background, previous vocational agriculture participation, previous high school biology participation, concurrent high school biology participation, self-perceived interest in agriculture, self-perceived interest in science, post-graduation plans, and attitude toward agriculture were analyzed for their effect on the dependent variables.

Population and Sample

The population consisted of the students in all of the approximately 336 production vocational agriculture programs in comprehensive high schools in Illinois. Twelve schools were randomly selected from the population. The instructors were contacted and their consent given to participate in the study. Three schools dropped out during the course of the study, therefore the final sample consisted of 104 students in 9 schools, 57 in the control group and 47 in the treatment group.

Problem Area Selection

Prior to the beginning of the study, a content analysis was conducted of the Illinois Core Curriculum (Hemp & Courson, 1981; Hemp & Courson, 1982; Hemp & Courson, 1983; Russell & Courson, 1984) to ascertain which principles of biology could possibly be incorporated, and into which units of instruction they could possibly be incorporated. A literature review produced a list of 24 principles of biology for incorporation into secondary agriculture programs (Peterson, 1969; Starling, 1965; Sutherland & Sams, 1963). The list of principles was validated by two panels of experts, one from agricultural teacher education, the other consisting of an agronomist and a science educator. Each core curriculum unit and problem area was reviewed by the researcher, and units and problem areas showing promise as locations for incorporation of the principles were identified. As a result, a total of 70 problem areas (35% of the total) were identified which could be used for incorporation of biological principles.

Two problem areas were selected from the core curriculum, "Growing Corn" and "Growing Soybeans". Since the objectives for these two problem areas were identical, they were treated as one. For the treatment group teachers, the teacher's guides for these two problem areas were altered slightly by the researcher to reflect the integration of biological principles into the lesson. Additional information on biological concepts was also provided. The control group teachers used the unaltered core problem area teacher's guides to teach the two problem areas.

Instrumentation

All instruments were developed by the researcher. The problem area pretest and posttest were adapted from instruments used by Starling (1965), Peterson (1969), and Flowers (1986). A pool of 40 items was reviewed by a panel of experts from the University of Illinois to establish content validity. The items were pilot tested for clarity and reliability and item analysis was performed. A KR-20 coefficient of .82 was achieved for the item pool. Fifteen items were included on the pretest and 24 items on the posttest. Ten items in the posttest were identified as measures of applied biology achievement, and this subset of items was analyzed separately after the overall analysis. Criteria used to identify applicative items required that the item:

1. Required an application of knowledge to a problem.
2. Included some form of action.
3. Apply knowledge based on biological principles.

Two instruments were developed to measure student attitude. Student attitude toward agriculture was measured for use as an independent factor. This instrument was adapted from follow-up instruments used by Iverson and Brown (1979), Arrington and Price (1983), and Arrington (1984). Student attitude toward the curricular plan used was also measured. An instrument was adapted from instruments used by Peterson (1969) and by Flowers (1986). Content validity was established by a panel of experts. Both instruments were pilot tested for clarity and reliability. Cronbach's Alpha coefficients of .85 and .87 were calculated for the attitude toward agriculture and the attitude toward the curricular plan instruments, respectively. Nineteen items were included on the final attitude toward agriculture instrument and twenty items were included on the final attitude toward the curricular plan instrument.

ANALYSIS OF DATA

All tests and attitude instruments were administered by the vocational agriculture teachers and sent to the researcher for scoring and analysis. In addition, the teachers completed an instrument containing teacher and program information.

Analysis of covariance was the primary data analysis method used. Pretest scores were used as the primary covariate measures. Descriptive statistics, frequencies, means, standard deviations, percentages, t-tests, and measures of correlation were also used to analyze the data.

RESULTS

Demographic Characteristics and Student Achievement

Demographic data collected on the independent variables grade, background, previous agriculture participation, previous high school biology participation, concurrent biology participation, self-perceived interest in agriculture, self-perceived interest in science, and post-graduation plans are presented in Table 1, along with p values resulting from the test of the hypothesis H0: $p_1 = p_2$. The figures reveal that the control group was more "farm-oriented" than the treatment group, with the treatment group having a significantly higher percentage of students with nonfarm backgrounds. A significantly higher percentage of the treatment group had also completed a biology course prior to the study. Also, a significantly higher percentage of control group students planned on immediate employment after high school. Correlation coefficients were calculated to determine the relationship between the student demographic characteristics and overall achievement. Results are presented in Table 2, revealing that achievement increased significantly with nonfarm students, with previous biology experience, and with plans for further education beyond high school.

Table 1

Student Demographic Characteristics

Variable	%Treatment	%Control	p
Ninth graders	15	14	.45
Tenth graders	45	25	.04
Eleventh graders	21	40	.05
Twelfth graders	19	21	.42

Table 1 (continued)

Farm background	40	54	.10
Rural nonfarm background	11	28	.04
Town background	49	18	.003
No previous ag. courses	28	26	.43
1-2 previous ag. courses	60	51	.23
3 + previous ag. courses	12	23	.12
Previous biology course	60	37	.03
Concurrent biology course	32	14	.04
High level interest in ag.	74	77	.39
High level interest in science	55	49	.31
Further education plans	49	35	.12
Immediate employment plans	17	37	.03
Unsure of plans	34	28	.30

Table 2
Relationships Between Achievement and Demographic Variables

Variable	r	p
Background	-.15	.06
Previous agriculture participation	.08	.22
Previous biology participation	-.41	.01
Concurrent biology participation	-.07	.25
Self-perceived interest in ag.	-.09	.17
Self-perceived interest in science	-.06	.28
Post graduation plans	-.21	.02
Attitude toward agriculture	.28	.01

Data concerning student attitude toward agriculture are shown in Table 3. A t-test revealed that students assigned to the treatment group scored significantly higher than those assigned to the control group (p .05). The significance of preexisting differences between treatment and control group students in background, previous biology experience, post-graduation plans and attitude toward agriculture, combined with the significance of the correlation of those variables with student achievement, influenced the decision to utilize these variables as additional covariate measures in the final analysis

Table 3
Attitude Toward Agriculture by Group

	N	X	S.D.	t
Integrated Approach Group	47	63.87	9.98	2.16
Traditional Approach Group	57	60.03	8.17	

Analysis of Student Achievement

Overall student achievement was measured by student scores on the 24-item posttest. A test of hypothesis $H0_1$ was performed on the test score means. Analysis of covariance using pretest score, background, previous biology participation, post-graduation plans, and attitude toward agriculture as multiple covariate measures was used to perform the analysis. Results of the analysis of covariance F test and the observed and adjusted means are shown in Table 4. The analysis of covariance F value of 25.58 was highly significant (p .01), and therefore the hypothesis of no difference in overall achievement between treatment and control groups was rejected.

Table 4
ANCOVA Summary: Overall Achievement by Group Adjusted for Covariates

Source of Variation	SS	df	MS	F
Covariates	658.56	5	131.71	12.88*
Pretest score	267.18	1	267.18	26.05*
Background	.08	1	.08	.01
Previous biology	38.25	1	38.25	3.73
Post graduation plans	4.74	1	4.74	.46
Attitude toward ag.	20.56	1	20.56	2.00
Curriculum Group	262.30	1	262.30	25.58*
Residual	933.20	91	10.26	
Total	1854.05	97	19.11	

*p .01

Mean Scores	$\overline{X}$ (observed)	$\overline{X}$ (adjusted)
Integrated Approach Group	13.63	13.13
Traditional Approach Group	9.25	9.76

Applied biology achievement was measured by student scores on the subset of 10 "applicative" items within the 24-item posttest. A test of the hypothesis $H0_2$ was performed, using the aforementioned variables as covariate measures. Results, along with observed and adjusted mean scores, are presented in Table 5. The ANCOVA F value of 9.00 was again highly significant (p .01), and therefore the hypothesis of no difference in applied biology achievement between treatment and control groups was rejected.

Analysis of Student Attitude Toward the Curricular Plan

Student attitude toward the curricular plan used was measured by a 20-item attitude instrument. As a preliminary analysis, correlation coefficients were calculated to determine which independent variables were most related to student attitude. Self-perceived interest in agriculture (r = .56), self-perceived interest in science (r = .20), and post-graduation plans (r = .17) were most significantly related to attitude, and were therefore used as covariate measures in the analysis of covariance F test for the hypothesis $H0_3$. Mean attitude scores and results of the analysis of covariance are presented in Table 6. The F value of 17.44 was highly significant (p .01), and therefore the hypothesis of no difference in attitude toward the curricular approach used between treatment and control groups was rejected.

Table 5
ANCOVA Summary: Applied Biology Achievement by Group Adjusted for Covariates

Source of Variation	SS	df	MS	F
Covariates	74.35	5	14.87	4.87*
Pretest score	38.41	1	38.41	12.58*
Background	.53	1	.53	.17
Previous biology	1.93	1	1.93	.63
Post graduation plans	0.00	1	0.00	.00
Attitude toward ag.	1.32	1	1.32	.43
Curriculum Group	27.48	1	27.48	9.00*
Residual	277.80	91	3.05	
Total	379.63	97	3.91	

*$p < .01$

Table 5 (continued)

Mean Scores	$\overline{X}$ (observed)	$\overline{X}$ (adjusted)
Integrated Approach Group	4.84	4.66
Traditional Approach Group	3.45	3.63

Table 6
ANCOVA Summary: Attitude Toward Curricular Approach by Group Adjusted for Covariates

Source of Variation	SS	df	MS	F
Covariates	2683.41	3	954.47	6.38*
Interest in ag.	1466.89	1	1466.89	9.80*
Interest in science	108.36	1	108.36	.72
Post graduation plans	505.77	1	505.77	3.38
Curriculum Group	2611.50	1	2611.50	17.44*
Residual	14823.71	99	149.73	
Total	20298.62	103	197.07	

*p .01

Mean Scores	$\overline{X}$ (observed)	$\overline{X}$ (adjusted)
Integrated Approach Group	67.66	65.36
Traditional Approach Group	57.54	58.85

Discussion of Results

Although the differences in mean scores between treatment and control groups were significant, both groups achieved failing scores. This was possibly due to the difficulty of the tests, the format of the tests, or the length of the tests. In addition, the F values indicated that the difference in overall achievement was much greater than the difference in applied biology achievement. This seems strange given the nature of the treatment. A possible explanation lies in the nature of the "applicative" items on the posttest. All ten of the "applicative" items were practical agricultural questions which, given adequate agricultural background, a student could answer correctly without the background knowledge of biological principles. Also, some items not included in the subset asked for "straight biology" knowledge. It is assumed that the treatment group students achieved many more correct answers on these items than did the control group, given their advantage. This would have inflated the differences in overall achievement

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. In the two problem areas selected, the integrated approach is superior to the traditional approach in producing higher overall achievement.

2. In the two problem areas selected, the integrated approach is superior to the traditional approach in producing higher applied biology achievement.

3. The integrated approach is especially beneficial for nonfarm students. This is especially important given the increasing proportion of nonfarm students populating vocational agriculture programs.

4. The integrated approach has a remediating effect for students with no previous high school biology.

5. The integrated approach makes instruction more interesting to students

Recommendations for Further Research

1. Expand the scope of the study to include other program areas such as horticulture and "urban" agriculture programs. This would serve to establish a basis for comparison of different types of agriculture programs, and the effectiveness of the integrated approach in each type.

2. Expand the duration of the study to include a semester, year, or multiple years of instruction. This would provide for more easily analyzable and generalizable results, and also for comparison of many different types of problem areas.

3. Compare achievement and attitudes of students taught using the integrated approach to those of students taught biology by traditional means. Studies of this nature could provide a rigid test of the academic rigor of agricultural education programs.

4. Expand to include other science areas such as physics, and the social sciences. This would provide strategy and rationale for more complete integration of agriculture and the sciences.

5. Develop and test instruments which measure achievement in applied settings. Measuring knowledge of a subject being applied to another subject is extremely difficult, and considerable time and effort could and should be devoted to this area.

6. Studies should be conducted to ascertain and to facilitate the compatibility of integrated approaches with other paramount features of agriculture programs, most notably problem solving instruction, supervised occupational experience, and FFA.

7. Curricular plans and materials for using the integrated approach should be developed, tested, revised, and disseminated to teachers for use in local agriculture programs as soon as possible.

Recommendations for Practice

1. Teacher education programs should concentrate on developing in future agriculture teachers the ability and skills necessary for integrating academic with agricultural instruction.

2. Teacher educators should work closely with teachers in the field to develop and disseminate strategies for using integrated approaches to teaching agriculture.

3. Teachers and teacher educators should collaborate with professionals in other disciplines (e.g. science education) to develop strategies for using integrated approaches.

4. Agricultural education policy should focus on new and emerging areas of endeavor such as applied academics and should make these areas top priorities for research and development.

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INTEGRATING BIOLOGY AND AGRICULTURE: EFFECTS ON STUDENT ACHIEVEMENT AND ATTITUDES

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This is an important topic with the present emphasis on integrating academics into vocational education.

Differences between groups did not seem to be adequately accounted for other than using a pre-test. There is certainly doubt that the two groups are equal.

Reading this study, several questions come to mind, including: Were the objectives for the two groups in the study the same? Were the listed competencies to be attained at the same level of specificity? Would longer term effects be the same?

The fact that students who know agriculture could answer many of the questions whether or not they knew biology certainly raises questions about some of the test items.

The difficulty of the test where both groups failed raises questions about the test and, to some extent, its usefulness in distinguishing between groups.

While difficult to control, the effectiveness of teachers may be a major factor in the results of this type study.

LEARNING STYLES PREFERRED BY STUDENTS IN AGRICULTURE

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INTRODUCTION

In their efforts to help students achieve skills and master knowledge, vocational agriculture instructors are challenged by students with a wide variety of learning styles. As agricultural educators, we need to account for individual differences among learners to optimize learning experiences in agriculture programs. Do we change the learning environment? Do we change the way our students learn? Or do we change the educational delivery system?

A student's performance in education is a product of whatever mixture of predispositions they bring to that performance that interact with the educational tasks and situations presented. Cognitive style is a concept that refers to individual differences in cognition--acquiring and processing information--which includes all of the processes by which knowledge is acquired: perception, thought, memory, and problem solving. Variations in one's style of cognition implies more than just degrees of skill or ability; it also implies the existence of individual differences and preferences in the actual manners of gaining, storing, processing, and using information. This leads one to conclude that there is both a qualitative and quantitative variation in mental functioning that underlies the concept of cognitive style. Learning style encompasses four aspects of an individual's psychological makeup: (1) cognitive styles or information processing habits, (2) patterns of attitudes and interest, (3) compatible dispositions to one's cognitive style, and (4) dispositions to use or not use certain learning tools.

A learning style consists of combinations of cognitive, affective, and physiological traits. Cognitive or learning styles are associated with the overlap between individual differences in intellectual abilities and personality characteristics. Collectively, they are used to characterize how learners typically learn best. Knowledge about learning styles provides a deeper, more profound view of the learner than previously perceived, and is part of a basic framework upon which a sounder theory and practice of thinking, learning, and instruction may be built. Studies of learning style suggest that individuals tend to place themselves in and seek out situations and tasks which will allow them to use their preferred modes of bringing new information into their cognitive structures.

Strong, Silver, and Hanson (1985) defined the five principal goals of education: mastery, understanding, synthesis, involvement, and cultural literacy. Each of these goals included a set of teaching strategies and a set of thinking and learning styles. Inherent within each of these factors are relationships between the learner, the teacher, and curriculum. The effectiveness of the student's critical thinking skills will be influenced by the predispositions they have towards acquiring and processing information--thinking and learning. This cognitive process is approached by individuals with varying styles of performance. Cognitive or learning styles are associated with the overlap between individual differences in intellectual abilities and personality characteristics. Research has shown that an individual's propensity for a certain manner of work in a given situation is different from but constrained by one's intellectual ability and their personality.

MSU students enrolled in agriculture majors in 1977 and 1982 had mean high school grade point averages of 2.95 and 2.96, respectively. The mean high school grade point average for the 1987 students was 2.92. Data from the 1977 Southern Region study revealed high school grade point averages of 3.01 for agriculture majors and 2.88 for agricultural education majors. The mean high school grade point averages for Agricultural and Extension Education majors at MSU were 2.83 in 1982 and 3.19 in 1987 (see Table 6).

Table 6

High School Grade Point Averages for Students Enrolled in the College of Agriculture and Home Economics in 1977, 1982, and 1987

	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
GRADE	n	%	n	%	n	%	n	%
All agriculture majors								
A	686	22.3	28	21.6	51	22.3	38	20.5
B	1,747	56.8	67	51.5	119	52.2	95	51.4
C	630	20.5	35	26.9	56	24.6	46	24.9
D	12	.4	-	-	2	.9	5	2.7
(Missing)	-	-	(1)	-	(1)	-	(1)	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0
Mean GPA:	3.01		2.95		2.96		2.92	
Agricultural Education majors								
A	32	12.9	-	-	4	17.4	5	31.3
B	154	62.1	-	-	11	47.8	9	56.2
C	62	25.0	-	-	8	34.8	2	12.5
(Missing)	(10)	-	-	-	-	-	-	-
Total	258	100.0	-	-	23	100.0	16	100.0
Mean GPA:	2.88				2.83		3.19	

The data revealed that 77% of the 1977 MSU students in agriculture majors had not taken agricultural classes while in high school. The percentage decreased to 76% in 1982 and 70% in 1987. Seventy-five percent of the students in the 1977 Southern Region Study did not enroll in high school agriculture classes. Sixty percent of the students in both the 1977 and 1982 studies indicated that agriculture was not offered in their high schools. This figure declined to 51% in 1987. For the Agricultural and Extension Education majors, 82% in the 1977 study had taken agriculture in high school. This dropped to 65% in 1982 and further to 63% in 1987. These data are shown in Table 7.

In both 1977 and 1982, 49% of the agriculture majors came directly to MSU after graduation. Thirty-eight percent of the 1977 sample transferred from 2-year colleges; 40% used this route in 1982. Forty-three percent of the students

Strategies referred to by Perkins as "specific actions to be taken at specific points in a problem" (1985, p. 350) have been identified as cognitive strategies (Kirby, 1979). Sternberg (1984) referred to these strategies as "metacomponents" which he described as "the higher order or executive processes that we use to plan what we are going to do, monitor what we are doing, and evaluate what we have done" (p. 40).

Sternberg and Caruso (1985) defined practical knowledge as "procedural information that is useful in one's everyday life" (p. 134). Practical knowledge must be procedural rather than declarative and the knowledge must be relevant to one's everyday life. It is stored in the form of condition-action sequences. If a certain condition is met, a certain action is performed. Practical knowledge is acquired in three ways--direct learning, mediated learning, and tacit learning--and can be applied through adaptation, shaping, and selection.

Hammonds and Lamer (1968) stressed the implications and applications of the psychology of learning to teaching and learning. "Sensing and solving problems are recognized functions in higher mental processes. Problem solving is a primary tool for learning" (p. 78). However, they stressed that problem solving is not synonymous with learning; the purpose of presenting problems in teaching is to promote understanding.

PURPOSE AND OBJECTIVES

This study examined the impact that learning styles may have on the critical thinking levels of Iowa agriculture students and individual preferences for learning activities while in an agriculture course.

The specific objectives of this study were to:

1. Assess and analyze levels of critical thinking of students related to learning style.
2. Determine the learning styles of Iowa agriculture students.
3. Analyze learning activities associated with learning style.

PROCEDURES

The population of interest in this study consisted of agriculture students enrolled in 262 agriculture programs in Iowa. The total enrollment of Iowa agriculture students in grades 9-12 was determined to be 10,603.

Cluster sampling was used because it was not possible to obtain a list of all members of the population. The population was divided into non-overlapping groups of elements, in this case schools. Schaeffer et al. (1986) stated that "if these groups are considered to be clusters, then a simple random sample of groups is selected, and the sampled groups are then subsampled..." (p. 234)

It was determined from Oliver et al (1983, 1985) that the minimum sample size should be 325 respondents. Upon recommendation by the Statistical Laboratory and the Statistics Department at Iowa State University, this sample size was increased by 50 percent to assure that the cluster sample adequately represented the population. A new minimum sample of 437 respondents was determined to be necessary.

The number of schools needed to generate the minimum sample was based upon the state-wide average number of students in each program. Using a computer-generated table of random numbers, 25 schools were initially selected for sampling. Telephone interviews were conducted to ascertain teachers' interest in cooperating in this study and to estimate the number of unduplicated 9th, 10th, 11th, and 12th grade students enrolled in their agriculture courses. Eighteen schools were selected for inclusion in this study and one of the instructors served two schools. The goal of 437 respondents established as the baseline sample was exceeded. A total of 18 schools and 668 students participated in the study. The final sample represented approximately six percent of all high school agriculture students in Iowa.

Upon a review of literature and available tests, the Cornell Critical Thinking Test Level X^R (Ennis and Millman, 1985) was selected to collect the data. It is a 71-item, multiple-choice, normed test intended to be taken in a 50 minute period. Each item has three choices and one keyed answer. Level X was designed primarily for evaluation and is aimed at 4th- through 14th-graders. Scores were normed using suburban high school students.

The Myers-Briggs Type Indicator^{TM} (MBTI) Form G (Briggs and Myers, 1977) was administered to each respondent to determine their learning style. The MBTI was selected for administration primarily due to its application across broad population segments. It has also been used extensively in research dealing with personalities and learning styles of high school students. The MBTI identifies four individual preferences or strengths that persons use in gathering information and making decisions. Using four of the eight factors, a person's learning style is derived from a possible combination of sixteen types.

The MBTI contains four separate indices which reflect one of four basic preferences directing the use of an individual's perception and judgement. The four preferences are: Extraversion or Introversion (E or I); Sensing perception or Intuitive perception (S or N); Thinking judgment or Feeling judgment (T or F); and Judgment or Perception (J or P). The Sensing (S) and Intuition (N) preference reveals basic learning style differences.

Agriculture instructors in each of the randomly-selected high schools were sent a letter requesting their participation and cooperation in the research study. A package of school-coded test materials was forwarded to each of the 18 different schools participating in the study. All agriculture students were administered the Cornell Critical Thinking Test Level X^R during the prescribed 50 minute period of time. Students were administered the MBTI during the length of the class period. Instructors recorded information from the individual student's cumulative folders to Student Data Sheets. If a respondent failed to provide sufficient information, a follow-up telephone call was made to ascertain the appropriate information.

ANALYSIS OF DATA

An identification number was assigned to each school and to each respondent to identify the participant by school and individual. Descriptive statistical procedures used for data analysis included frequencies, percentages, means, and standard deviations on all of the items on the information and the student data sheets.

Inferential statistical analyses were performed using a variety of procedures. Tests for significant differences included group t-tests and one-way analysis of variance. The Scheffe post hoc test (.05) was used to determine where differences existed when a significant difference was found and more than two groups were being compared. Stepwise regression procedures were employed to predict student critical thinking scores.

RESULTS

Descriptive information about the respondents (N=668) is provided in Table 1. The tenth grade class composed the largest percentage of respondents whereas the smallest percentage of respondents was from the twelfth grade class. Almost equal percentages of the respondents were 15 or 16 years of age. The next largest age group was 17 years of age followed by 14-year-olds.

Table 1. Description of respondents

Variable	Percent	Number
Grade		
9	25.75	172
10	27.99	187
11	24.40	163
12	21.86	146
Total	100.00	668
Age		
4	15.53	98
15	26.78	169
16	28.53	180
17	20.13	127
18	9.03	57
Total[a]	100.00	631
Semesters of vocational agriculture		
1-2	40.24	268
3-4	27.03	180
5-6	21.32	142
7	11.41	76
Total[b]	100.00	666
Years in FFA		
1	36.38	231
2	28.19	179
3	21.26	135
4	14.17	90
Total[c]	100.00	635
High school leadership positions		
1-2	50.23	223
3-4	23.87	106
5-6	12.61	56
More than 7	13.29	59
Total[d]	100.00	444

[a] Missing cases = 37.
[b] Missing cases = 2.
[c] Missing cases = 33.
[d] Missing cases = 224.

The largest category of respondents had been enrolled in either one of two semesters of agriculture. The smallest category had been enrolled for seven semesters. Nearly two-thirds of the respondents had been in the FFA for one or two years. The remaining one-third had completed three to four years of FFA membership.

Listed in Table 2 are the means, standard deviations, F-ratio, and F-probability for levels of critical thinking of the respondents grouped according to grade level. The mean score for all respondents was 36.89. The lowest level of critical thinking was observed for respondents in the tenth grade (mean = 34.51) and the highest level of critical thinking was observed for respondents in the twelfth grade (mean = 40.55). An analysis of variance test on these group means revealed that highly significant differences existed among group means. A Scheffe' post hoc test revealed differences among mean scores for grade 12 and all other grade level means.

Table 2. Critical thinking means, standard deviations, F-ratio, and F- probability by grade in school.

		Level of critical thinking			
Grade	N	Mean	S.D.	F-ratio	F-probability
9	171	36.12	9.36	11.11	.000
10	187	34.51	10.13		
11	163	37.17	9.60		
12	146	40.55	9.60		
Total[a]	667	36.89	9.91		

[a] One missing case.

Sixteen different learning styles emerged as a result of administering the MBTI to each of the respondents. Contained in Table 3 are the means, standard deviations, F-ratio, and F-probability for the level of critical thinking classified by learning styles. The learning style with the highest critical thinking mean score was INFP, followed closely by ENFP. The ISTP learning style had the lowest mean score and was closely followed by the ESTP style and the ENTJ style. An analysis of variance test on the group means indicated that highly significant differences existed among the group means.

Table 3. Means, standard deviations, F-ratio, and F-probability for levels of critical thinking by learning style.

Learning Style	N	Mean	S.D.	F-ratio	F-probability
INFJ (Innovator)	2[a]	44.00	15.56	3.08	.0003
INFP (Helper)	19	41.84	9.32		
ENFP (Planner of Change)	42	41.48	10.10		
ENFJ (Harmonizer)	7[a]	39.71	8.30		
ISFP (Helper))	28	39.71	9.19		
INTP (Analyzer)	46	39.02	8.30		
ISFJ (Mgr. of Facts)	19	38.42	7.78		
ESFJ (Harmonizer)	20	38.20	9.52		
ESFP (Realistic Adaptor)	62	37.82	9.23		
ISTJ (Mgr. of Facts)	47	37.43	12.02		
ENTP (Planner of Change)	63	37.08	9.87		
ESTJ (Organizer)	61	36.54	10.19		
ENTJ (Organizer)	20	35.60	11.00		
ESTP (Realistic Adaptor)	112	35.19	8.41		
ISTP (Analyzer)	111	33.67	0.11		
INTJ (Innovator)	11[a]	29.64	11.20		
Total	668	36.86	9.93		

[a] Cell size insufficient for calculation.

Table 4 contains the range of means among grades, composite means, and rankings for preferences "while learning in an agriculture course." It was observed that "learning in laboratories and shop activities" had the highest group mean and composite mean in the table and was "much preferred" by all four groups. An analysis of variance test on the group means revealed significant differences among means. A Scheffe' post hoc test revealed no significant differences among group means.

Table 4. Range of means among grades, composite means,and rankings for preferences "while learning in an agriculture course."

Learning Activity In an agriculture coure, I prefer to learn:	Mean High	 Low	Composite Mean	Rank
1. Using audiovisual materials (films, slides, TV, etc.	62.94	57.64	60.03	8
2. In discussion groups with my classmates.	65.19	55.40	59.86**	9
3. When material is presented logically and orderly.	66.25	51.76	56.88**	13
4. When I can use a computer.	64.75	52.41	57.34**	10
5. Giving reports on topics interesting to me.	46.53	32.24	39.44**	17
6. By memorizing facts.	31.11	22.57	28.17**	19
7. Working on group project with classmates.	68.91	66.79	67.60	2
8. By being creative and original.	69.05	56.97	63.80**	4
9. Through independent study.	49.57	36.54	43.40**	14
10. From topics selected by other students.	46.03	39.58	41.77	15
11. Observing specific things and activities.	61.46	59.51	60.64	6
12. By formalized instruction (lectures, teacher assignments, homework).	39.05	27.42	34.15**	18
13. By reading books and teaching myself things.	44.15	32.98	39.51**	16
14. From demonstrations in class.	66.64	55.16	60.62**	7
15. From personal relationships.	59.75	52.11	57.03*	12
16. In laboratories and shop activities.	79.34	72.22	76.04*	1
17. When someone takes a personal interest and involvement in me.	64.55	56.30	61.37*	5
18. By following my own impulses and being flexible.	72.75	63.00	66.92**	3
19. By thinking and reasoning by myself.	63.53	50.34	57.26**	11

* Significant at .05 level
** Significant at .01 level

"Working on group projects with classmates" had the second highest composite mean. The means of the four groups were closely clustered within two points of each other and indicative of "much preference." An analysis of variance test on the means revealed no significant differences among these means. Ranked next to last and of "little preference" to the respondents was "learning by formalized instruction (lectures, teacher assignments, homework)." It was anticipated that the lowest-ranked learning preference would result when students had "to memorize facts". This preference ranked nineteenth for all four grades.

Table 5. Stepwise regression analysis of variables on critical thinking scores

Step	Variable entered	B[a]	Multiple	F-ratio[b]
1	Reading total score (ITED subtest)	.531	.533	92.29
2	Cumulative grade point average	2.965	.553	51.23
3	"Judgment" score (MBTI)	.170	.571	37.19
4	Number of leadership positions in high school	.149	.585	29.84
5	"When material is presented in a logical, orderly method" (learning preferences)	.051	.594	24.97
6	"When someone takes a personal interest and involvement in me" (learning preferences)	-.043	.606	22.01
	Constant = 8.399	Multiple R^2 = .3668		

[a] Regression coefficients for the final prediction equation. [b] $F_{1,233,.05} = 3.84$.

A stepwise regression procedure to predict student critical thinking scores yielded six student characteristics which entered the prediction equation and accounted for 36.68 percent of the critical thinking variance. The Reading Total Score, a subtest from the Iowa Tests of Educational Development, was the first variable to be entered into the equation and accounted for approximately 28 percent of the critical thinking score variance. Cumulative grade point average added slightly more than two percent, "judgment" slightly less than two percent, and each of the remaining three variables added between one and two percent to the total variance explained by the prediction equation. Residual variance could not be explained by remaining variables at the established level of significance.

CONCLUSIONS

The four highest critical thinking mean scores were all -NF- types comprising only ten percent of the sample studied; this fact may very well confirm the theoretical constructs of critical thinking alleged by the authors of the test. Almost one-third of the respondents studied had either ESTP (N=112) or ISTP (N=111) learning styles. Their critical thinking mean scores were below the mean score observed for the sample. The level of critical thinking in the secondary agriculture student in this study was related to their level of academic and educational achievement and their predominant learning style.

Over half (57%) of the respondents studied preferred the Sensing (-S--) learning style. Three of the four Sensing (-S--) group mean scores of the respondents were below the mean score for the sample. It would seem evident, therefore, that four of every ten respondents (43%) inclined to use the Sensing (S) learning style in an agriculture course were at a distinct disadvantage when levels of critical thinking were being evaluated. The majority of respondents who favored the Sensing (S) learning style also preferred to learn through a variety of instructional techniques which are unique to agricultural subject matter; they overwhelmingly preferred interactive and experiential learning activities. Conventional instructional techniques met with much disfavor among all respondents.

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Learning Styles Preferred by Students in Agriculture
A Critique

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Individual differences among learners and learning styles preferred by students are important concerns of agricultural instructors. The researchers provide a framework for studying learning styles and have developed a set of clearly stated objectives. Instruments that are described in the literature were used and it appears that the study was methodologically sound.

My primary concerns related to the conclusions and implications for the study. To me, the conclusions are more a restatement of the findings rather than taking a position on what the results mean. The implications for action could be more clearly indicated and expanded. Other suggestions include indicating the reliability of the instruments and noting the assumptions made in determining the sample size. In the comments about Table 4, the researchers note, "An analysis of variance test on the group means revealed significant differences among means. A Scheffé post hoc test revealed no significant differences among group means." I would like to see a brief explanation of what this means.

I commend the researchers for exploring an important concern of teachers and recommend they continue this area of work.

LONGITUDINAL STUDY OF UNDERGRADUATE AGRICULTURE MAJORS: 1977, 1982, AND 1987

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LONGITUDINAL STUDY OF UNDERGRADUATE AGRICULTURE MAJORS: 1977, 1982, AND 1987

INTRODUCTION

Declining college enrollments in agricultural curricula coupled with the shortage of agricultural scientists and an unusually high percent of faculty who are of retirement age, have created a national concern for the expertise needed to respond to challenges of the 21st century (Reisch, 1984). This dilemma has prompted renewed interest in recruiting. According to Reisch (1984), there are not many recruitment techniques that have not been already tried. For years, those responsible for recruiting have done so without really knowing the needs or desires of prospective students. Presently, recruitment techniques to attract rural, urban and suburban students must be used.

Several investigations have focused on the development of profiles of agriculture majors enrolled in institutions of higher learning. The initial profile of undergraduate students enrolled in agriculture majors in the South, including Mississippi State University, was compiled using the data extracted from the 1977 USDA/CSRS regional project, S-114 (Parent, 1979; Howell and Parent, 1979).

In 1982, Bowen and Lee used the same design and instrumentation as in the S-114 project to collect data to analyze and describe trends that may have developed after five years for agricultural education majors and other college of agriculture majors enrolled at Mississippi State University (Bowen and Lee, 1984). These researchers described and compared selected characteristics of students in the 1977 S-114 project with students enrolled in agriculture majors at Mississippi State University in 1982. Findings of the study, when compared to the 1977 data, showed that parents and college faculty continued to have the most influence on students choosing a major; and students continued "to select majors that helped them prepare for a specific career and lead a desired lifestyle" (1984, pp. 28-29). The researchers concluded that undergraduate students in agriculture majors in the College of Agriculture and Home Economics in 1982 were not 'tremendously' different from those studied in 1977.

Studies by Slocombe (1986), Cole (1985) and Findlay and Rawles (1984) also found that parents and college professors had most influence on choice of major. Slocombe found that university literature and campus visitation influenced choice of major. He recommended that college faculty and administrators acquaint parents with the various curricula through quality literature and personal visits.

PURPOSE OF THE STUDY

The purpose of this study was to describe trends that may have developed after ten years for both agricultural education majors and other college of agriculture majors. Objectives of the study were to: (1) describe the characteristics of students enrolled in agriculture majors in the College of Agriculture and Home Economics at Mississippi State University in 1987; (2) compare the characteristics of students enrolled in the College of Agriculture and Home Economics at Mississippi State University in 1977 and 1982 to those of students enrolled in 1987; (3) compare the characteristics of students enrolled in colleges of agriculture in the South in 1977 and at Mississippi State University in 1977, 1982 and 1987; and (4) identify enrollment trends that may have developed over a ten year period.

PROCEDURES

Design and instrumentation for this study were identical to those for the 1977 and 1982 studies. Data collection procedures were identical to those used in the 1982 study. A list of all undergraduates enrolled in the College of Agriculture and Home Economics in the Fall of 1987 was obtained from the Dean of the College. A stratified random sample of 261 students was selected for the study. Students were stratified by major. Data collection extended over a four week period. Copies of the questionnaires were distributed to a faculty or staff contact for each major who, in turn, gave them to the students. Students returned the questionnaire to the contact persons. Those persons who had not returned the questionnaire after two weeks were mailed another copy. During the fourth week, telephone calls were made to those who had not responded.

A total of 185 or 70.9% of the returned questionnaires were usable. Using data received from other sources, persons responding after two weeks, those responding after four weeks, and those who did not respond were compared on five variables: high school grade point average, college grade point average, classification, ACT scores, and sex. There were no differences found among the three groups on any of these variables.

FINDINGS

The following findings relate to data collected over a ten-year time frame. Data were collected at three times: 1977, 1982 and 1987.

The age range of students enrolled in agriculture majors at Mississippi State University (MSU) was 18 to 36 years. Mean ages for the three years showed a slight increase from 20.9 years in 1977 to 21.0 in 1982 to 21.3 in 1987. The percentage of females pursuing agriculture majors in the College increased between 1977 and 1982; there was a slight decrease in this percentage between 1982 and 1987. Females comprised 19% of the 1977 sample, 24% of the 1982 sample, and 22% of the 1987 sample. Twenty-seven percent of the students in the 1977 Southern Region study were female (see Table 1).

Table 1

Sex of Agricultural Students in the College of Agriculture and Home Economics in 1977, 1982, and 1987

SEX	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	n	%	n	%	n	%	n	%
Male	2,244	73.0	106	80.9	175	76.4	145	78.04
Female	831	27.0	25	19.1	54	23.6	40	21.60
Total	3,075	100.0	131	100.0	229	100.0	185	100.00

The percentage of seniors in the 1987 MSU sample continued to increase while the numbers of juniors and sophomores continued to decline when compared to data from the previous studies. Table 2 shows that seniors comprised 32% of the 1977 MSU sample, 37% in 1982 and 44% in 1987. In the 1977 Southern Region Study, 32% of the sample were seniors. Juniors dropped from 32% in 1977 to 29% in 1982 and further to 27% in 1987. The decrease in sophomores was from 22% in 1977 to 19% in 1982 to 16% in 1987. The 1977 Southern Region study was comprised of 27% juniors and 22% sophomores.

Table 2

Classification of Agricultural Students in the College of Agriculture and Home Economics in 1977, 1982, and 1987

	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
CLASS	n	%	n	%	n	%	n	%
Freshman	563	18.3	18	13.5	34	15.0	20	10.8
Sophomore	688	22.4	29	22.3	43	18.9	30	16.2
Junior	829	27.0	41	31.6	66	29.1	49	26.5
Senior	995	32.3	42	32.3	84	37.0	82	44.3
(Missing)	-	-	(1)	-	(2)	-	(4)	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0

The MSU samples showed a continuing increase of students from urban areas. Thirty-eight percent of the 1977 students resided in urban areas, 43% in 1982 and 55% in 1987. Students from urban areas comprised 57% of the 1977 Southern Region Study. Rural, non-farm students in the MSU samples decreased from 27% in 1977 to 26% in 1982 then substantially to 14% in 1987. In the 1977 Southern Region Study, 23% of the students were rural, non-farm (see Table 3).

Table 3

Residence Status of Agricultural Students in the College of Agriculture and Home Economics in 1977, 1982, and 1987

	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
RESIDENCE	n	%	n	%	n	%	n	%
Urban (Towns > 10,000)	1,738	56.5	51	37.6	98	42.8	101	54.5
Rural, Non-farm	707	23.0	35	27.2	59	25.8	26	14.1
Rural, Farm	630	20.5	44	35.2	72	31.4	57	30.8
(Missing)	-	-	(1)	-	-	-	(1)	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0

Married undergraduates in agriculture majors at MSU decreased by nine percent, between 1977 and 1982. Table 4 shows that this number increased by four percent between 1982 and 1987.

Table 4

Marital Status of Agricultural Students in the College of Agriculture and Home Economics in 1977, 1982, and 1987

MARITAL STATUS	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	n	%	n	%	n	%	n	%
Single	2,654	86.3	109	83.3	212	92.6	163	88.1
Married	421	13.7	21	16.2	17	7.4	20	10.8
(Missing)	-	-	(1)	-	-	-	(2)	00.0
Total	3,075	100.0	131	100.0	229	100.0	185	100.1

While the MSU students who graduated from public high school dropped from 68% in 1977 to 57% in 1982, this figure rose slightly to 60% in 1987. Students who graduated from public high schools made up 88% of the 1977 Southern Region study. Agricultural and Extension Education majors at MSU who graduated from public high schools totaled 78% of the 1982 sample and 75% in 1987. Ninety-seven percent of the agricultural education students in the 1977 Southern Region study graduated from public high schools. (see Table 5).

Table 5

Type of High School Attended by Students Enrolled in the College of Agriculture and Home Economics in 1977, 1982, and 1987

TYPE OF SCHOOL	Southern Region 1977		MSU 1977		MSU 1982		MSU 1987	
	n	%	n	%	n	%	n	%
All agriculture majors								
Public	2,715	88.3	88	68.2	130	57.0	111	60.0
Private, Religious	206	6.7	9	7.0	20	8.8	13	7.0
Private, Non-Religious	154	5.0	32	24.8	78	34.2	55	29.7
(Missing)	-	-	(2)	-	(1)	-	(6)	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0
Agricultural Education majors								
Public	242	96.8	-	-	18	78.3	12	75.0
Private, Religious	8	3.2	-	-	5	21.7	2	12.5
Private, Non-Religious	-	-	-	-	-	-	-	-
(Missing)	(8)	-	-	-	-	-	2	12.5
Total	258	100.0	-	-	23	100.0	16	100.0

in the 1987 study came directly to Mississippi State University while 42% transferred form 2-year colleges. Data from the 1977 Southern Region survey indicated that 65% enrolled after high school and 18% transferred from 2-year colleges.

Table 7

Students Enrolled in the College of Agriculture and Home Economics in 1977, 1982, and 1987 Who Took Vocational Agriculture Classes in High School

AGRICULTURAL CLASSES TAKEN	Southern Region 1977 n	Southern Region 1977 %	MSU 1977 n	MSU 1977 %	MSU 1982 n	MSU 1982 %	MSU 1982 n	MSU 1982 %
All agriculture majors								
Yes	770	25.0	29	22.7	56	24.5	55	29.7
No	2,305	75.0	99	77.3	173	75.5	130	70.3
(Missing)	-	-	(3)	-	-	-	-	-
Total	3,075	100.0	131	100.0	229	100.0	185	100.0
Agricultural Education majors								
Yes	205	82.0	-	-	15	65.2	6	62.5
No	45	18.0	-	-	8	34.8	6	37.5
(Missing)	(8)	-	-	-	-	-	-	-
Total	258	100.0	-	-	23	100.0	16	100.0

Data in Table 8 show that students in all three samples had attained a variety of work experiences. Approximately 60% in each of the MSU samples had home farm experience. Nearly 50% of each sample had been employed on farms other than the home farm. Almost 90% of the students in both the 1977 and 1982 studies had non-agricultural work experience; however, this dropped to 78% for students in the 1987 study.

Table 8

Work Experience of College of Agriculture and Home Economics Students in 1977, 1982, and 1987

WORK EXPERIENCE	Southern Region 1977 n	Southern Region 1977 %Yes	MSU 1977 n	MSU 1977 %Yes	MSU 1982 n	MSU 1982 %Yes	MSU 1987 n	MSU 1987 %Yes
Home farm experience	1,561	50.8	75	61.5	141	66.8	109	58.9
Other farm employee	1,549	50.4	53	48.2	113	54.1	87	47.0
Other work experience	1,869	60.9	110	89.4	177	88.1	144	77.8

Fathers were rated by students in all three samples as having the greatest influence on their choice of college major; mothers were rated second. College teachers/advisors and college friends were also influential regarding choice. As shown in Table 9, all three groups assigned the same ranking to these individuals.

Table 10

Importance of Selected Factors on Choice of Major by College of Agriculture and Home Economics Students in 1977, 1982, and 1987

FACTOR	Southern Region 1977 (N=3,075)			MSU 1977 (N=131)			MSU 1982 (N=229)			MSU 1987 (N=185)		
	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK
Career preparation	2.68	.57	1	2.66	.64	1	2.76	.49	1	2.60	.65	1
Style of life	2.18	.82	2	2.18	.84	2	2.13	.83	2	2.06	.85	2
Prior ag experience	1.76	.83	5	1.94	.86	3	1.90	.84	4	1.85	.86	5
Good income	1.84	.76	4	1.91	.74	4	1.77	.72	5	1.88	.71	4
Help others	2.09	.74	3	1.90	.77	5	1.95	.75	3	1.90	.79	3
College courses	1.45	.71	6	1.43	.72	6	1.37	.66	6	1.40	.69	6
College teacher/ advisor	1.31	.59	9	1.34	.63	8	1.32	.58	8	1.29	.57	9
Scholarships/ financial aid	1.40	.72	7	1.34	.67	8	1.31	.64	9	1.38	.67	7
Family	1.27	.52	10	1.31	.54	9	1.34	.56	7	1.32	.50	8
Friends in major	1.22	.48	12	1.26	.51	10	1.27	.52	12	1.28	.49	10
Better grades	1.26	.54	11	1.25	.51	11	1.28	.56	11	1.40	.65	6
H. S. counselor	1.21	.51	13	1.18	.46	12	1.16	.44	13	1.17	.45	11
H. S. courses	1.33	.63	8	1.17	.50	13	1.28	.60	11	1.28	.57	10

1=No Importance, 2=Some Importance, 3=Very Important

Career preparation was rated by students in all samples as the most important factor in their choice of college major. Lifestyle was the second most important factor. Data from the three samples were similar for all the factors and are presented in Table 10.

Table 9

Individuals Influencing Choice of Major for College of Agriculture and Home Economics Students Included in 1977, 1982, and 1987 Samples

INDIVIDUAL OF INFLUENCE	Southern Region 1977 (n=3,075)			MSU 1977 (n=131)			MSU 1982 (n=229)			MSU 1987 (n=185)		
	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK	$\bar{x}$	SD	RANK
Father	1.87	.79	1	2.06	.79	1	2.11	.77	1	1.93	.77	1
Mother	1.79	.72	2	1.82	.67	2	1.87	.69	2	1.86	.69	2
College teacher/ advisor	1.56	.75	3	1.61	.79	3	1.50	.69	3	1.62	.72	3
College friend	1.51	.70	4	1.44	.62	4	1.47	.65	4	1.55	.71	4
Brother	1.36	.64	6	1.42	.63	5	1.37	.64	6	1.25	.53	11
Veterinarian	1.33	.65	10	1.37	.74	6	1.28	.61	8	1.28	.59	9
H. S. friend	1.36	.61	6	1.33	.63	7	1.32	.57	7	1.29	.55	8
Former student	1.35	.64	8	1.32	.63	8	1.43	.65	5	1.36	.61	6
Sister	1.28	.52	12	1.30	.52	9	1.24	.55	11	1.24	.51	12
Other teacher/ principle	1.35	.62	8	1.26	.54	10	1.26	.51	9	1.30	.57	7
H. S. counselor	1.29	.58	11	1.21	.46	11	1.21	.49	13	1.51	.42	5
Vo-Ag. teacher	1.34	.68	9	1.18	.53	12	1.25	.61	10	1.27	.57	10
Extension agent	1.18	.49	13	1.16	.43	13	1.22	.54	12	1.21	.49	13

Means: 1=No Influence, 2=Some Influence, 3=Very Influential

CONCLUSIONS AND RECOMMENDATIONS

For the MSU students, there appears to be trends developing in terms of the numbers of students from urban areas and those who enroll in high school agriculture courses. Recruitment efforts should focus on urban as well as rural area students and should not be limited to those enrolled in high school agriculture. More of the 1977 agricultural education majors, when compared to other students in the 1977, 1982 and 1987 studies, had taken agriculture courses while in high school.

The parents of students in agriculture majors in 1987 continued to have strong influence on their children regarding choice of major and students continued to select majors that will prepare them for careers and lead to desired lifestyles. Parents of prospective students should be included in the recruitment process and prospective students should be provided with current career information. Data from this study did not support some of the trends thought to have been developing in students who select agriculture majors when compared to data from the 1982 study.

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Longitudinal Study of Undergraduate Agriculture Majors: 1977, 1982, and 1987 A Critique

Vernon D. Luft, North Dakota State University--Discussant

This was a study of undergraduate agriculture majors at Mississippi State University for the purpose of describing trends that may have developed after ten years for both agricultural education majors and other college of agriculture majors.

Strengths of the Study

These are the strengths of this study most worthy of note.

1. The report is clear, concise, and very well organized. The data are presented in tables that are clearly labeled and easy to understand.
2. The purpose and objectives are clearly stated. As they are read, one understands exactly what the researchers were attempting to accomplish.
3. Research procedures employed for the conduct of this study appear to be sound. A stratified random sampling procedure, follow-up procedures, and appropriate descriptive statistics were used.

Areas to Strengthen

Although this report represents an excellent piece of research, some questions and/or suggestions may be made to strengthen it further.

1. Table 2 reveals the number and percentage of students at each grade level in MSU's College of Agriculture and Home Economics; the narrative reports the same. This table contains an interesting finding that was not highlighted appropriately--the fact that the 1987 senior group increased over previous years whereas the freshman, sophmore, and junior groups decreased. That resulted in not only a decline in overall enrollment from 1982 to 1987, but may mean that the College is in for a further decline in the near future. It may indicate that recruitment efforts should be "stepped-up" immediately.
2. In the conclusions and recommendations the authors make some general recommendations. It would have been interesting to read or to hear what implications the findings may have for agricultural education.

The authors are to be commended for conducting a study that is useful to Mississippi State University and for sharing the results with us. In closing, I'd like to ask this of the presenters: What actions have been taken by people in your College of Agriculture and Home Economics as a result of previous studies in this longitudinal effort?

MAJOR ROLES OF AGRICULTURAL EXTENSION AGENTS IN THE AGRICULTURAL TECHNOLOGY DELIVERY SYSTEM IN THE YEAR 2000

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Under provisions of the Smith-Lever Act of 1914, Cooperative Extension was established to provide informal education to the public, specifically to ". . . aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same . . ." The outgrowth is a nationwide system of informal education offering the public opportunity for lifelong learning.

Since its inception, the focal point of Cooperative Extension has been the county extension agent. Advances in agricultural and nonagricultural technologies have stirred debate on the functional importance of county agents in the agricultural technology delivery system. In addition, the overwhelming dominance of nonagricultural occupations poses an unprecedented threat not only to agricultural programs, but to the organization itself. Perhaps the importance of this study is best emphasized by the remarks of Dillman (1986):

> Concern about the future makes this an especially relevant time to examine the structure and activities of Cooperative Extension and consider the degree to which they are appropriate . . . I believe firmly that to meet the challenges of the coming years requires hard thinking about the changes that must occur in Cooperative Extension if it is to enter the next century as an important service agency. (p. 102)

OBJECTIVE

The objective of this study was to determine the major roles of county agricultural Extension agents in the agricultural technology delivery system in the year 2000 as perceived by State Directors of Cooperative Extension.

PROCEDURES

The descriptive method of research was utilized in this study. In order to develop a valid survey instrument, a letter of introduction and explanation was mailed to State Directors of Cooperative Extension (N=67) along with a request that each director identify the five major roles which, in his/her opinion, agricultural extension agents would play in the agricultural technology delivery system in the year 2000. Followup letters were sent to those who failed to respond. Vague statements were identified as to the source and telephone calls made to obtain clarification. Fifty-three survey forms were returned, of which 52 were usable.

A review committee, composed of two graduate students and two faculty members, then reviewed, sorted and combined statements received and, whenever necessary, edited statements without altering the intended meaning. The edited statements were compiled to form the second survey instrument.

The second instrument, consisting of 72 statements, was administered to the same population. Directors were asked to rate each statement as to its perceived importance as a role of agricultural Extension agents in the year 2000 on a scale of 5 - Essential; 4 - Very Important; 3 - Important; 2- Somewhat Important; and 1 - Not Important. Completed forms were received from 55 directors (82%). As a check on nonresponse bias, seven statements were randomly selected for comparison. Telephone calls were made to five randomly selected directors to solicit their responses. Results revealed no significant differences between respondent and nonrespondent ratings when responses were analyzed with the t-test.

FINDINGS

Of the 72 statements rated by study participants, 10 achieved overall mean ratings of 4.25 and above, as seen in Table 1. The statement with the highest rating (overall mean of 4.56) places the agent in the role of "problem solver bringing to bear the resources of the land grant university on the needs and problems of the clientele." Consensus of opinion on that statement was reinforced in that, in addition to having the highest overall mean of the 72 statements rated, it also had the lowest standard deviation (SD of 0.60).

Four of the top ten items are related to the agent's role as a link between the clientele and the research community. In this role, directors visualize the agent as an interpreter and a disseminator of research as well as one who helps identify research needs and to integrate research into the production and marketing of agricultural products. Other items relate to the agent's role as a program planner, in community economic development programs, as an educator and as a user of technology to deliver information to clientele.

Statements were grouped into 10 categories to assist in interpretation and presentation of data. While the statement, "coordinate and promote youth program in the county" was considered important (overall mean of 3.31), it was the only statement that dealt with the agent's future responsibilities toward youth. The statement was considered significantly more important by directors from the southern region and from 1890 institutions than by others.

Three of the major roles identified by directors were those in which the agent would assume a specialized position. These roles were perceived as being important though not essential. The specialized role rated highest (overall mean of 4.11) called for the agent to assume multi-county responsibility by serving as the expert in a particular program area.

The most highly rated statement in the category of resource development was one in which the agent would participate in agriculturally based economic development programs. Five other roles were perceived by directors in this category. A major difference of opinion emerged when responses of directors with and without agent experience were compared. Those without agent experience considered it much more important that the agent in the year 2000 utilize volunteers to extend his/her influence than did those with agent experience.

Ten statements in the second instrument were related to technology usage. Applications of technology ranged from providing software to clientele and the use of microcomputers to expert systems and interactive satellite video. No significant differences were found in any of the variables studied. Perceived as most important roles were microcomputer usage to deliver expert production and marketing systems and the use of interactive video to assist in planning and decision making.

Directors evaluated eight roles in which the agent would be a provider of information. Most important was the role which called for the agent to serve as an objective source of information for clientele. Also considered very important was the role of interpreter of new developments in agriculture. The roles of arranging client contact with Extension specialists and linking potential users of technology with those who have the technology were perceived significantly more important by directors in 1890 institutions than by those in 1862 institutions.

Part of the extension mission has been to interpret and disseminate research based information and technology. Continuation of this practice in the future is evident as four research related roles were considered essential by directors. Highest rated statements in this category were roles of interpreting, localizing, and disseminating research based information, service as a linkage between clientele and the research community, and using a systems approach to integrate research into the family farm system.

Nine roles identified were concerned with problem solving, though only one was rated with an overall mean above 4.25, i.e., "A problem solver, bringing to bear the resources of the land grant university on the needs and problems of the clientele." That statement eloquently and accurately reflects the philosophy and mission of Extension education as it exists today.

Generating the most differences of opinion among respondents were the statements dealing with policy and political roles of agents. While all six statements in this category were considered important by directors, those from the northeast and southern regions considered the roles involved with farm organization and advisory committee work, public policy awareness, and poverty eradication significantly more important than did those from the north central and western regions. Further, directors of 1890 institutions considered roles concerned with public policy awareness, poverty eradication, and communication of policy and regulations to be significantly more important than did directors from 1862 institutions.

Since the Extension Service is an educational organization, it was not surprising that directors identified several teaching and communication roles that agents would fill in the year 2000. Future agents, according to directors, will be "resident educators" and not simply facilitators. This will require enhanced expertise in agricultural technology and teaching methodologies. Other major roles include communicating local issues to

Extension and research colleagues, bridging the gap between specialists and producers, and providing direct consultations with clients.

Almost synonymous with "Extension agent" is the title "change agent," in that Extension education objectives often encourage clientele change. Eight of the roles identified by directors address change—change in clientele; change in Extension agent roles; change in Extension education. Directors particularly favored program development directed at the application of improved technology. They also expect the agent to be knowledgeable of diverse subject matter and changing clientele. Directors at 1890 institutions more strongly favor the role of encouraging clientele to work toward self-sufficiency and in utilizing innovative approaches to serve the hard to reach audience than do those in 1862 institutions.

The product-moment coefficient of correlation was utilized to determine relationships between ratings of statements in each category and directors' ages, years in their positions, and years as a county agricultural Extension agent (Table 2). A significant relationship was found only between directors' years in their present positions and their ratings of statements in the category of roles in which the agent would function as a problem solver.

RECOMMENDATIONS

1. In order to expand the knowledge base and broaden the area of expertise from which to draw upon to serve Extension's clientele, directors should cultivate cooperative agreements with all colleges and departments in the university system.

2. Agencies and institutions supported by the USDA that are conducting agricultural research should more vigorously solicit Extension input in the process of assessing research needs.

3. USDA supported agencies and institutions conducting research should develop efficient conduits which will provide Extension with maximal accessibility to research information, and assist the development of practical applications which will accelerate the transfer and adoption of technologies.

4. Research and Extension staff must be maintained at a level at which the maximum potential for agricultural development can be reached.

5. Extension should thoroughly investigate applications for electronic technologies to ensure that implementation achieves the expected benefits.

6. Extension must provide adequate inservice training to ensure proficient staff and the development of new competencies.

7. Further research should be conducted in the areas of land grant university obligations to citizens, effectiveness of university based research in promotion of agricultural development, application of electronic technologies in Extension, and problems affecting the transfer of technologies by Extension.

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Table 1

Major Roles of Agricultural Extension Agents in the Agricultural Technology Delivery System in the Year 2000 as Perceived by State Extension Directors, with Mean Ratings of 4.25 and Above

Statement	Mean Rating (N=55)	Standard Deviation
A problem solver bringing to bear the resources of the land grant university on the needs and problems of the clientele.	4.56	0.60
Interpret and localize research based information to address high priority needs.	4.46	0.77
Continue to disseminate technology from research.	4.46	0.79
Serve as a linkage between clientele and research community to identify high priority problems limiting success of agricultural enterprises that could be addressed through either applied or basic research.	4.44	0.66
The integration of agricultural production, marketing, and policy research base into the family farm system, involving interpretation, application, and integration through a systems approach.	4.44	0.72
Program planning, implementation and evaluation.	4.41	0.77
Participate in agriculturally based economic development programs.	4.37	0.76
Serve as a resident educator, not simply a facilitator. This will require enhanced expertise in agricultural technology and teaching methodologies (people skills).	4.30	0.94
Become proficient in the use of technology, such as microcomputers to deliver expert production and marketing systems to innovators, larger producers and any other interested producers.	4.28	0.71
Will continue to be the "eyes and ears" for determining local needs and developing statewide programs.	4.28	0.74

Rating Scale:
5 - Essential
4 - Very Important
3 - Important
2 - Somewhat Important
1 - Not Important

Table 2

Relationships Between Statement Ratings and Directors' Ages, Years in Present Position, and Years as a County Agricultural Extension Agent

	r-Value		
Category	Age	Years in Present Position	Years as an Agent
Youth	.21	.01	.07
Specialist	-.01	.07	.06
Resource Development	-.05	-.02	-.10
Technology	-.04	-.10	-.16
Information	.11	.05	-.12
Research	.02	-.13	.10
Problem Solving	-.11	-.31*	.18
Policy and Politics	.04	.05	.02
Education, Teaching and Communication	-.01	-.11	.04
Change Agent	.05	-.13	.07
Miscellaneous Functions	-.01	-.02	-.07

* Significant at the .05 level of confidence.

Table 3

Comparison of the Top Ten Perceived Major Roles of Agricultural Extension Agents, by Directors at 1862 and 1890 Universities

Directors at 1862 Universities		Directors at 1890 Universities	
Statement	Mean	Statement	Mean
The integration of agricultural production, marketing, and policy research base into the family farm system, involving interpretation, application, and integration through a systems approach.	4.56	Serve as a linkage between clientele and research community to identify high priority problems limiting success of agricultural enterprises that could be addressed through either applied or basic research.	4.78
A problem solver bringing to bear the resources of the land grant university on the needs and problems of the clientele.	4.53	Work with those on the cutting edge of technology to determine and support research in subject matter areas that will contribute to profitable farming and ranching.	4.67
Interpret and localize research based information to address high priority needs.	4.49	Will be serving a much broader urban agriculture clientele than at present.	4.67
Continue to disseminate technology from research.	4.49	A problem solver bringing to bear the resources of the land grant university on the needs and problems of the clientele.	4.67
Serve as a linkage between clientele and research community to identify high priority problems limiting success of agricultural enterprises that could be addressed through either applied or basic research.	4.38	Identifying and using innovative approaches designed to serve the hard to reach audience (non-traditional participants).	4.67
Program planning, implementation and evaluation.	4.38	Encourage clientele on working toward self-sufficiency.	4.67
Participate in agriculturally based economic development programs.	4.33	Serve as change agents by being knowledgeable of diverse subject matter and changing clientele.	4.67
Will continue to be "eyes and ears" for determining local needs and developing statewide programs.	4.29	Participate in agriculturally based economic development programs.	4.56
Serve as a resident educator, not simply a facilitator. This will require enhanced expertise in agricultural technology and teaching methodologies (people skills).	4.29	Program planning, implementation and evaluation.	4.56
Become proficient in the use of technology, such as microcomputers, to deliver expert production and marketing systems to innovators, larger producers and any other interested producers.	4.27	Identify and pass to Extension administrators client concerns, problems and opportunities.	4.56
Utilize electronic technology, such as interactive video and expert systems, to assist in planning and decision making.	4.27	Contribute toward the eradication of poverty among rural citizens.	4.56

Rating Scale:
5 - Essential
4 - Very Important
3 - Important
2 - Somewhat Important
1 - Not Important

Table 4

Major Roles of Agricultural Extension Agents in the Year 2000 as Perceived by State Extension Directors, by Region

North Central Region (n=10) Statement	Mean	Northeast Region (n=16) Statement	Mean
Interpret and localize research based information to address high priority needs.	4.60	Continue to disseminate technology from research.	4.80
Serve as a linkage between clientele and research community to identify high priority problems limiting success of agricultural enterprises that could be addressed through either applied or basic research.	4.50	Program planning, implementation, and evaluation.	4.80
Continue to disseminate technology from research.	4.40	A problem solver bringing to bear the resources of the land grant university on the needs and problems of the clientele.	4.73
Participate in agriculturally based economic development programs.	4.40	Interpret and localize research based information to address high priority needs.	4.67
Become proficient in the use of technology, such as microcomputers, to deliver expert production and marketing systems to innovators, larger producers and any other interested producers.	4.30	Serve as a linkage between clientele and research community to identify high priority problems limiting success of agricultural enterprises that could be addressed through either applied or basic research.	4.67
Assume responsibility for assigned specialized technology and become proficient to serve these clientele on the cutting edge of technology.	4.30	Will continue to be "eyes and ears" for determining local needs and developing statewide programs.	4.67
Work with those on the cutting edge of technology to determine and support research in subject matter areas that will contribute to profitable farming and ranching.	4.30	The integration of agricultural production, marketing, and policy research base into the family farm system, involving interpretation, application, and integration through a systems approach.	4.60
The integration of agricultural production, marketing, and policy research base into the family farm system, involving interpretation, application, and integration through a systems approach.	4.30	Keep on top of emerging issues as seen from the local level, and communicate these issues to appropriate Extension and research colleagues beyond the local level.	4.47
A problem solver bringing to bear the resources of the land grant university on the needs and problems of the clientele.	4.30	Program development, directed at the application of improved technology, including the identification of high priority needs, program planning, program implementation and evaluation.	4.47
Introduce new, innovative ideas, processes and enterprises.	4.30	Working with agricultural producers on total resource management including financial management, labor management, time management and production scheduling for maximum efficiency.	4.40 4.40
		Get producers to recognize the need for integrated management information as opposed to production information.	4.40
		Serve as a resident educator, not simply a facilitator. This will require enhanced expertise in agricultural technology and teaching methodologies (people skills).	4.40

(Continued)

Table 4 (Continued)

Southern Region (n=18)		Western Region (n=10)	
Statement	**Mean**	**Statement**	**Mean**
Participate in agriculturally based economic development programs.	4.67	The integration of agricultural production, marketing, and policy research base into the family farm system, involving interpretation, application, and integration through a systems approach.	4.40
A problem solver bringing to bear the resources of the land grant university on the needs and problems of the clientele.	4.61	A problem solver bringing to bear the resources of the land grant university on the needs and problems of the clientele.	4.40
Program planning, implementation and evaluation.	4.56	Direct client consultation - the agent will continue to be the field representative for the Extension network.	4.40
Serve as a resident educator, not simply a facilitator. This will require enhanced expertise in agricultural technology and teaching methodologies (people skills).	4.50	Teach integrated problem solving using complex production, management, economic and social information.	4.33
Become proficient in the use of technology, such as microcomputers, to deliver expert production and marketing systems to innovators, larger producers and any other interested producers.	4.44	To teach leadership skills and techniques for agriculture and rural communities, and provide the framework for human resource development.	4.30
Serve as a linkage between clientele and research community to identify high priority problems limiting success of agricultural enterprises that could be addressed through either applied or basic research.	4.44	Assume responsibility for assigned specialized technology and become proficient to serve these clientele on the cutting edge of technology.	4.30
Continue to disseminate technology from research.	4.44	Get producers to recognize the need for integrated management information as opposed to production information.	4.30
Assist clientele in the use of an integrated system of evaluating market alternatives and implementation of improved marketing strategies for agricultural products.	4.44	Agent will have a regional (multi-county) responsibility as the expert (specialist) in a specialized program area.	4.20
Utilize electronic technology, such as interactive video and expert systems, to assist in planning and decision making.	4.39	Interpreter of new developments in biotechnology and agricultural chemicals.	4.20
Interpret and localize research based information to address high priority needs.	4.39	Will continue to be "eyes and ears" for determining local needs and developing statewide programs.	4.20
The integration of agricultural production, marketing, and policy research base into the family farm system, involving interpretation, application, and integration through a systems approach.	4.39	Continue to serve as a bridge between specialist/research community and producers, particularly for small and middle-sized farming and ranching operations.	4.20
Serve as change agents by being knowledgeable of diverse subject matter and changing clientele.	4.39	Program development, directed at the application of improved technology, including the identification of high priority needs, program planning, program implementation and evaluation.	4.20

Rating Scale:
5 - Essential
4 - Very Important
3 - Important
2 - Somewhat Important
1 - Not Important

Major Roles of Agricultural Extension Agents in the Agricultural Technology Delivery System in the Year 2000
A Critique

Gregory A. Nolting, University of Missouri--Discussant

This topic is important to the industry as we look to the next century. It is important that we look at every aspect of dealing with our clients and how we can better meet their needs. I applaud the authors in the design of the study that included the decision makers to look at how we will conduct business in the future.

There are a few concerns that I have with this study. The introduction is brief and presents a position of dominance of non-agricultural jobs. Virtually, any industry in our society could take this same position. After all, I thought it has always been a compliment that we are able to produce so much by so few.

The objectives of the study need to be further defined so that the later findings are not something unrelated to what the reader would think the study is about.

When tables are available it is always better to focus the attention of the reader to the data as the subject is being discussed. This provides the reader with clearer understanding of the subject and thus greater retention.

The statistical method employed in the study insured the researcher that an error is made. The problem is we do not know which one of the findings may be erroneous.

Many of the recommendations are very good advice but should not be drawn from the data presented. It would be difficult for an administrator to implement many of the recommendations with a high level of certainty of success.

As with much research we often uncover more questions than we answer. Such is the case with this study. The authors did a good job of trying to answer important questions needed for the future of the profession. Perhaps they have set the stage for further research.

MISSION AND OBSTACLES FOR RESEARCH IN AGRICULTURAL EDUCATION: A NATIONAL DELPHI TECHNIQUE INVOLVING EXTERNAL EXPERT ADVISORS

by

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INTRODUCTION

A century of systematic research has established science and technology as central components of the U. S. agricultural industry (Kerr, 1987). This dedicated research effort has discovered facts, as well as revised accepted theory. Today's research mission in agriculture was shaped by external expert advisors. Kerr related that "together, the national advisory panels went far toward the goal of providing national policymakers with an agenda arrived at by a consensus of public institutions, private industry, and consumers, and expressed in understandable terms of problems and opportunities", (p. 182).

Research is engaged in quiet revolution. Meaningful research is currently conducted by the top research universities in the United States. Agricultural education must identify important researchable problems which will lead to clear, meaningful solutions as viewed by national policymakers.

What techniques provide a best estimate for research missions and obstacles? 1) Systematic inquiry is essential. 2) The Delphi technique, a series of diverging and converging cycles based on the intuition of expert advisors, is useful for scenario development (Dalkey, 1969). 3) Futuring as a research tool, involves a long planning horizon and is not tied to specific data to predict trends (PDK, 1984). These techniques can provide a unique window through which to gain a better understanding of our values and direction for research in agricultural education.

PURPOSE AND OBJECTIVES

The purpose was to identify future missions of, and obstacles to, research in agricultural education. The research questions included:

1. What should be the research missions of agricultural education?

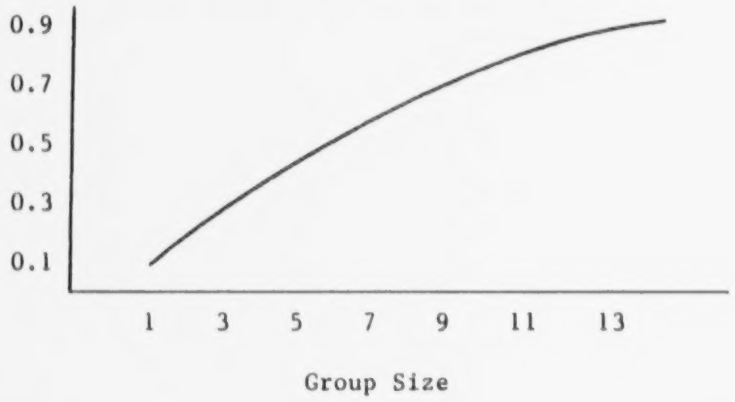
2. What obstacles limit systematic research in agricultural education?

PROCEDURES AND ANALYSIS

Decision-makers play key roles in the approval and support of research. Deans of Agriculture (DAG), Directors of Experiment Stations (DIR), and Deans of Education (DED) form the nucleus of principal decision-makers in university settings. The Delphi technique was used to collect the views of these decision-makers. Thirty-one research institutions with agricultural education as a part of their institutional mission were identified from the list of the top 100 research universities in the United States (The Chronicle, 1987).

The initial Delphi questions were field tested for validity by a group of internal experts consistent with Nash (1978). Process reliability was estimated at 0.8, using a technique developed by the Rand Corporation (Dalkey, 1969). See Figure 1.

Figure 1. Reliability as a function of group size: mean correlations.



Personal correspondence was initiated with each expert to establish need, and to invite participation in this research (Dillman, 1983). In the initial Delphi round, Deans and Directors from the 31 research universities were asked to provide independent statements regarding future missions and obstacles to research. This first round Delphi was similar to brainstorming. No judgments were made by the researchers as to the value or direction of a statement.

The unedited statements were listed in a second round instrument. The three advisory groups independently sorted each statement into priorities using a Likert-type scale of 1 'Strongly Disagree' to 6 'Strongly Agree'. Personalized correspondence and a printed booklet-style instrument were used for Round 2.

The third round instrument included only statements to which 50% or more of the experts rated as 5 'Agree' or 6 'Strongly Agree'. The percentage agreement on each statement by each group was provided. Individual item response values were highlighted in the personalized Round 3 instrument. Advisors were instructed to "read each statement and re-evaluate your level of agreement with the statement."

Descriptive statistics were used to analyze the mission and obstacle statements included in Round 2 and Round 3. The final analysis was based on descriptive statistics for each item by each advisory group. Consensus among the three groups was noted for each mission and obstacle statement.

FINDINGS

Missions

Twenty-six unique mission statements were collected from 54 Deans and Directors as a result of Round 1. Consensus within a group was achieved for 11 statements in Round 3.

DAG reached consensus on ten mission statements. They concurred with DIR on five statements and DED on seven statements. DAG identified two missions which were unique to the group. DIR reached consensus on six missions. DIR identified one unique mission and concurred with DED on four additional missions. DED reached consensus on seven mission statements and were not unique for any mission.

All advisors reached consensus on four research missions; program development, formal and informal teaching, occupational and career needs, and teaching and learning theory. Refer to Table 1 for specific mission statements and agreement patterns.

Obstacles

Thirty-one unique obstacles were collected as a result of Round 1. Fourteen statements were accepted for Round 3 based on the *a priori* decision.

DAG reached consensus on 12 obstacle statements. They did not identify any obstacle unique to their group. DAG concurred with DIR on ten obstacles and with DED on seven obstacles. DIR reached consensus on 11 obstacles. DIR concurred with DED on five obstacles and was unique on one obstacle. DED reached consensus on eight obstacles and identified one obstacle unique to the group.

Fourteen obstacles reduce the programmatic efforts of research in agricultural education. Consensus was achieved by the three groups for five obstacles to the conduct of research in agricultural education; lack of focus, inadequate qualifications, teaching and service orientations, insufficient funding, and a lack of value of research among agricultural educators. Refer to Table 2 for detailed obstacle statements and agreement patterns.

CONCLUSIONS AND RECOMMENDATIONS

1. External expert advisors are key players in the establishment of a national research agenda. Advisors can identify primary missions, as well as obstacles which impede the conduct of research in agricultural education.

2. The research missions of individual universities depend, to an extent, on organizational patterns. Departments organized in Colleges of Agriculture may have a different mission than those who are administered in Colleges of Education.

3. Research missions depend, to an extent, on relationships with the Experiment Station. Directors (DIR) are more likely to value research directed to technology transfer.

4. The eleven mission statements identified by the advisors should be focused and articulated to enhance the unique talents and organizational patterns within and among universities and states.

5. Mission statements should be carefully analyzed by internal experts. Agricultural education must identify important researchable problems which, if pursued rigorously, will lead to clear solutions for the profession.

6. A strategic plan to remove or minimize obstacles to research should be developed by individual researchers, universities, and the profession.

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Table 1: Research Mission

A. DEANS OF RESIDENT INSTRUCTION IN AGRICULTURE (DAG)			B. DIRECTORS OF EXPERIMENT STATIONS (DIR)			C. DEANS OF EDUCATION (DED)		
85.7%	C	Assure relevance of agricultural education programs in schools, universities and adult education in committees.	78.6%	AC	Improve the basis for development of new or modified programs of vocational education in agriculture.	100.0%	AB	Improve the basis for development of new or modified programs of vocational education in agriculture.
85.0%	BC	Improve the basis for development of new or modified programs of vocational education in agriculture.	78.6%	AC	Project future occupational and career needs to which vocational agriculture courses should respond.	85.7%	A	Build on the existing professional knowledge-base through inquiry that is both theoretical and applied. The research mission should focus on translating the research knowledge-base into practice.
78.6%		Assure more effective instruction on the part of teachers, more effective performances on the part of students, and a better informed public about agriculture.	71.5%	AC	Investigate curriculum developments and teaching methods (new and old), that are relevant and best facilitate learning in agriculture.	78.6%	AB	Improve the effectiveness of the delivery of agricultural programs, both formal and informal to students, the general public, and other clientele.
78.5%	BC	Improve the effectiveness of the delivery of agricultural programs, both formal and informal to students, the general public, and other clientele.	64.3%	AC	Improve the effectiveness of the delivery of agricultural programs, both formal and informal to students, the general public, and other clientele.	78.6%	AB	Project future occupational and career needs to which vocational agriculture courses should respond.
64.3%	C	Build on the existing professional knowledge-base through inquiry that is both theoretical and applied. The research mission should focus on translating the research knowledge-base into practice.	50.0%		Solve both contemporary problems and anticipated issues, relating to agricultural education.	78.6%	A	Focus on applied research in teacher preparation, facility development, program planning, curriculum development, and the development of educational objectives and missions as it applies to agriculture.
56.1%	BC	Investigate curriculum developments and teaching methods (new and old), that are relevant and best facilitate learning in agriculture.	50.0%	A	Focus on the cognitive processes through which individuals learn about agricultural issues, institutional arrangements, new educational technology, and the effects of cultural and socioeconomic factors on learning.	71.4%	AB	Investigate curriculum developments and teaching methods (new and old), that are relevant and best facilitate learning in agriculture.
50.0%	BC	Project future occupational and career needs to which vocational agriculture courses should respond.				50.0%	A	Assure relevance of agricultural education programs in schools, universities, and adult education in communities.
50.0%		Investigate motivation and decision-making processes of young people and provide data to effectively enhance leadership training.						
50.0%	C	Focus on applied research in teacher preparation facility development, program planning curriculum development, and the development of educational objectives and missions as it applies to agriculture.						
50.0%	B	Focus on the cognitive processes through which individuals learn about agricultural issues, institutional arrangements, new educational technology, and the effects of cultural and socioeconomic factors on learning.						

NOTE: Percentages represent the percentage of the advisory group 'agreeing' or 'strongly agreeing' (rating of 5 or 6) with the mission.

Prefix letters per research mission represent agreement with the opinions of the expert group as identified below.

A - Deans of Resident Instruction in Agriculture

B - Directors of Experiment Stations

C - Deans of Education

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Table 2: Research Obstacles

A. DEANS OF RESIDENT INSTRUCTION IN AGRICULTURE (DAG)		
92.9%	B	The perception that agricultural education research is "soft," without clearly defined objectives or hypothesis, and lacks rigor.
85.8%	B	Tradition; agricultural education departments have not traditionally been involved in research in agriculture.
78.6%	BC	Insufficient funding earmarked for research.
78.6%	BC	A lack of focus.
78.6%	BC	A teaching and service orientation among agricultural education professionals.
78.5%	C	Limited long-range planning of research programs (programmatic research)
64.3%	C	Limited amount of 'accountable' time (dedicated time) assigned for research.
57.2%	B	Convincing decision-makers (granting agencies and administrators) that agricultural education can identify important researchable problems which, if pursued rigorously, will lead to clear solutions.
57.1%	B	Limited contact, coordination and support of research conducted by agricultural education faculties by college of agriculture administrators (including experiment station).
57.1%	BC	Many agricultural educators do not value research endeavors; conducting research for promotion and tenure, rather than for its importance and utility to the profession.
50.0%	BC	Inadequate qualifications; agricultural education researchers have weak training in research methodology.
50.0%	B	A lack of definition; what is agricultural education.

B. DIRECTORS OF EXPERIMENT STATIONS (DIR)		
100.0%	AC	A lack of focus.
92.9%	A	Convincing decision-makers (granting agencies and administrators) that agricultural education can identify important researchable problems which, if pursued rigorously, will lead to clear solutions.
85.8%	AC	Inadequate qualifications; agricultural education researchers have weak training in research methodology.
85.7%	AC	A teaching and service orientation among agricultural education professionals.
85.7%	A	The perception that agricultural education research is "soft," without clearly defined objectives or hypthesis, and lacks rigor.
64.3%		A lack of networking among agricultural education personnel with strong research interests.
57.1%	AC	Insufficient funding earmarked for research.
57.1%	AC	A lack of definition; what is agricultural education.
50.0%	A	Tradition; agricultural education departments have not traditionally been involved in research agriculture.
50.0%	A	Limited contact, coordination and support of research conducted by agricultural education faculties by college of agriculture administrators (including experiment station).
50.0%	AC	Many agricultural educators do not value research endeavors; conducting research for promotion and tenure, rather than for its importance and utility to the profession.

C. DEANS OF EDUCATION (DED)		
85.7%	AB	Insufficient funding earmarked for research.
71.4%	A	Limited long-range planning of research programs (programmatic research).
64.3%	AB	A lack of focus.
64.3%	AB	A teaching and service orientation among agricultural education professionals.
64.3%	A	Limited amount of 'accountable' time (dedicated time) assigned for research.
50.0%	AB	Inadequate qualifications; agricultural education researchers have weak training in research methodology.
50.0%	AB	Many agricultural educators do not value research endeavors; conducting research for promotion and tenure, rather than for its importance and utility to the profession.
50.0%		Not enough theory building.

NOTE: Percentages represent the percentage of the advisory group 'agreeing' or 'strongly agreeing' (rating of 5 or 6) with the obstacles.

Prefix letters per research obstacles represent agreement with the opinions of the expert group as identified below.

A - Deans of Resident Instruction in Agriculture

B - Directors of Experiment Station

C - Deans of Education

Research Initiatives for Agricultual Education: A National Delphi Using External Decision-Makers
And
Mission and Obstacles for Research in Agricultural Education: A National Delphi Technique Involving External Expert Advisors
A Critique

George Wardlow, University of Minnesota -- Discussant

These papers by Professors Buriak and Shinn are from a larger study, and as such are closely related, utilizing similiar methodology. It is therefore much easier to discuss them together, at least from a conceptual and methodological view. This work by these researchers is potentially monumental for agricultural education, depending on how the profession accepts and utilizes the findings. Researchers often concern themselves with such matters as statistical significance to the exclusion of practical significance. These researchers, by the very nature of the problem they have studied, have focused on a topic of utmost practical significance to the profession.

Shinn and Buriak have focused on the academic question, "What is the body of knowledge the parameters of which define Agricultural Education?" It is foundational to the future of the profession within the academic context in which it functions.

This research seeks to build the knowledge base for informed research in agricultural education. It utilized a Delphi procedure to identify the research initiatives needed in agricultural education. Participants in the Delphi included decision-makers (education deans, agriculture deans and experiment station directors) in those university administrative units which are most likely to have responsibility for agricultural education programs which conduct the majority of research in the field. The study is conceptually and procedurally sound.

The "Research Initiatives" paper found concurrence among the participants on seven initiatives. It is most interesting that at least five of these seven dealt not with the content of agricultural education programs but rather with the process of agricultural education. Agriculture deans and education deans were in agreement on six additional items, all of which focused on concerns other than agricultural specific content. Even two of the three additional items on which experiment station directors and agriculture deans agreed dealt with process concerns. These findings provide clear support for research in agricultural education to focus on the larger issues of context and process rather than just content.

The "Mission and Obstacles" paper sought to identify the missions of and obstacles to research in agricultural education, as perceived by the three groups of decision-makers. Agriculture deans identified 10 missions, experiment station directors identified six, and education deans identified seven. Concensus across groups was reached on several mission statements including: program development, teaching, occupational needs, and teaching and learning theory. Concensus across groups was reached on five obstacles to research in agricultural education. Each of these has major implications for the profession and should be restated here: 1) lack of focus, 2) inadequate qualifications of researchers, 3) our teaching and service orientation, 4) insufficient funding, and 5) the feeling that agricultural educators do not value research. If this is the perception of agricultural education held by decision-makers who are responsible for our programs, it should be among our chief concerns.

In summary, these authors are to be commended for their fine research. While these findings may be less than palatable to the profession, the authors should be encouraged to continue their efforts.

Noise Exposure of Students While Arc Welding

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INTRODUCTION

Vocational Agriculture teachers should be concerned with student exposure to noise in agricultural mechanics laboratories. Studies have shown that these noise levels often exceed the safety limits for noise set by OSHA (1981), as documented by Bates (1983), Bear (1969), Madou-Bangurah (1978), Shell (1972), Wall and Jessee (1971), and Weston and Stewart (1980).

Teachers need to be aware of the noise generated by commonly used power tools. A concrete mixer charged with coarse aggregate and water may expose students to noise levels as high as 110 decibels. A student grinding steel with a portable grinder or a floor stand grinder may receive between 108 and 110 decibels. The OSHA (1981) allowable maximum exposure to a wood planer generating 110 decibels is 30 minutes in 8 hours. Recently, a student grinding the plates which commonly form the surface of a welding table took 23.19 minutes to accomplish the task. During that time, the maximum exposure to noise was 110.1 decibels and the cumulative exposure equalled 25% of the allowable total OSHA exposure for an 8-hour period.

Daniels(1985) and Jewell (1977) documented reduced student performance as a result of noise. Generally, reduced performance begins around 95 dB(A). Devices are available to protect students from exposure to noise. Weston and Adams (1935), Hartley (1974) and Miller (1986) found improved performance when subjects wore hearing protection devices (HPD's). Are these hearing protection devices necessary when students are arc welding? Do the noise levels for arc welding in specific agricultural mechanics laboratories enter the range where performance will be reduced or students exposed to dangerous levels?

PURPOSE

The purpose of this investigation was to survey noise levels in a specific agricultural mechanics laboratory while students completed common arc welds. The investigation addressed the following questions: What was the maximum noise students were exposed to while arc welding in the flat position? What percentage of the maximum dose recommended by OSHA did the students receive? Did the average noise level for arc welding exceed 90 dB(A) during the welding process?

PROCEDURES

For the purpose of this study, noise was measured in the agricultural mechanics laboratory at the University Campus Agricultural Center. The laboratory was constructed in approximately 1940 and extensively remodeled in the 1970's. The construction is brick and block with concrete floors and a ten-foot suspended ceiling of acoustical tiles. The eight welding booths are free standing, three feet by four feet enclosures made of pipe and steel. The booths contain an exhaust system, a welding table with an open grate and sand below. The booths are in a line adjacent to a brick wall with windows beginning at 4 feet and extending to the acoustical tile ceiling.

The course, designated as Agricultural Education 100A, "Agricultural Mechanics", was selected as a typical agricultural mechanics class which includes instruction and practice in welding skills. Students in the class were beginning welders who completed a stringer bead plate, a padding plate, a butt weld, and a horizontal fillet weld in the flat position.

A Simpson model 893 Noise Dosimeter/Sound Level Meter was used to monitor the noise in one arc welding booth. The meter was connected to a Simpson Model 894 Memory Storage Unit. A Simpson Model 895 Printer Unit was used to generate a histograph of the accumulated data.

To accurately determine dosage using a sound level meter requires the total length of exposure at each dB level to be weighted and summed (accumulated). The formula is:

$$D = \frac{C1}{T1} + \frac{C2}{T2} + - - \frac{Cn}{Tn}$$

The dosimeter makes these calculations automatically based on the formula:

$$\text{Dose} = 1/8 \int_{0}^{T} 10\exp[(L - Lc)/q]dt$$

Where: L = the A weighted time varying sound pressure level
T = time in hours
Lc = criterion sound level [80 dB(A)]
q = exchange rate (5/log2)

The data the meter produces is thus a dose percentage based upon a criterion sound level of 80 dB(A) or the maximum allowed by OSHA over an 8-hour period. The dosimeter is a very accurate and functional meter. The accuracy was further enhanced by the building of a remote microphone holder which placed the microphone near the student's ear while data were collected.

Data were collected while students completed required welds. Each student had the sound measurement device in the booth for two class periods while basic welds were completed. The entire noise measurement device was installed in the booth, not worn by the student. The microphone was placed to collect noise near the student's ear. Data were collected while padding plates and butt welds were being completed.

RESULTS

Data were successfully collected over a period of 14 class meetings. Table one summarizes the collected data by SPL maximum (Sound Pressure Level), L-8hr (Percent dose based upon the criterion level of 80 dB(A) and the OSHA formula), and Time (elapsed time).

Table 1 Collection date, SPL max, L-8hr, and Elapsed time.

Date 1987	SPL Max - dB(A)	L - 8hr % OSHA/80dB(A)	Elapsed time - Hr
9 - 22	97.4	3.4	2.29
9 - 24	94.3	1.5	2.31
10 - 1	99.2	5.0	2.55
10 - 6	105.0	5.8	2.04
10 - 8	111.2	8.9	2.25
10 -13	104.8	4.2	2.21
10 -15	110.2	7.2	2.48
10 -20	108.2	5.9	2.07
10 -22	108.9	3.5	2.09
10 -27	103.7	3.7	2.02
10 -29	107.7	4.9	2.40
11 - 3	101.9	2.8	2.26
11 - 5	101.4	3.2	2.37
11 -10	96.1	2.8	1.26
Average	103.6	4.24	2.18

The data collected on October 22 (10-22) shows that the student was exposed to a maximum of 108.9 dB(A) while the total exposure exceeding 80 dB(A) was 3.5% for the 2.09 hours of exposure.

Table 2 shows the 5 minute average levels in dB(A and is presented in the form of a histograph.

Table 2 Level greater than 80 dB(A) 5-minute averages for October 8, 1987.

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Hours =  00      80 dB(A)  90 dB(A)  100 dB(A)  110 dB(A)
Minutes            + . . . . + . . . . + . . . . +

:05:               | . . . . | . . . . | . . . . |
:10:               | . . . . | . . . . | . . . . |
:15:               | . . . . | . . . . | . . . . |
:20:               | . . . . | . . . . | . . . . |
:25:               ======. . | . . . . | . . . . |
:30:               ========. | . . . . | . . . . |
:35:               ======. . | . . . . | . . . . |
:40:               ======. . | . . . . | . . . . |
:45:               | . . . . | . . . . | . . . . |
:50:               ======. . | . . . . | . . . . |
:55:               ======. . | . . . . | . . . . |
:60:               | . . . . | . . . . | . . . . |
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According to the 5-minute averages, no 5-minute period had an accumulated average greater than 88 dB(A). This level is approaching the area of concern for reduction of student performance.

The computation for the 5-minute averages is referred to as L-OSHA. These are accumulated averages. The true average while the actual skill is being conducted is higher, as illustrated by Table 3. To arrive at the values in table 3, the interval between 25 and 30 minutes from the first hour was averaged by adding the five readings together and dividing by 5.

Table 3 One-minute readings from 25 to 30 minutes for the first hour of exposure from the data in Table 2

Hours:Minutes		Maximum Level dB(A)	L - OSHA dB(A)
00:26		101.0	91.0
00:27		86.4	80.0
00:28		101.5	91.5
00:29		98.7	88.1
00:30		98.0	82.5
	Average	97.1	86.6

The average maximum level taken over one-minute intervals exceeds levels potentially disruptive to student performance. The OSHA average for this interval is also close to the relative level of 90 decibels where student performance is affected.

CONCLUSIONS/RECOMMENDATIONS

Overall, the time a student spent in the arc welding booth completing required welds for AED 100A at the University Agricultural Mechanics Laboratory, Campus Agricultural Center posed no threat to hearing. Maximum noise measured was well below the 140 dB(A) impulse level set by OSHA. The percentage of noise exceeding 80 dB(A) computed over an 8-hour exposure was also low. It must be remembered that only noise within the booth such as welding and chipping was measured. If the student left the booth to grind or break welds, the additional exposure was not included in the overall exposure. Parallel measurements of laboratory noise taken in the center of the laboratory were even lower than those in the welding booth. It appears the noise level students were exposed to while actually welding approach the level recognized in the research as reducing student performance.

Further research to measure the effect of arc welding noise on student performance is justified. The use of hearing protection devices while arc welding solely to prevent hearing damage within the welding booth under the conditions at the University is probably unnecessary, but protection to prevent loss of performance is justified. The reader must remember that other noise within the laboratory or laboratories with different acoustical conditions could impact on the second recommendation insofar as hearing damage is concerned.

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Noise Exposure of Students While Arc Welding
A Critique

Jack L. Rudolph, Jr., University of Wyoming--Discussant

This paper begins with a rather detailed discussion of decibel levels recommended by the Occupational Safety and Health Act (OSHA), and further explains the negative effects of noise levels on student performance. The researcher builds a very good case for examining the potential problem in agricultural mechanics laboratories.

The questions for the study are clear:

1. What was the maximum noise level students were exposed to while arc welding in the flat position?
2. What percentage of the maximum dose recommended by OSHA did the student receive?
3. Did the average exposure exceed 90 decibels during the process?

The data for this study was collected in the University of Arizona agricultural mechanics laboratory which has been equipped with a drop ceiling constructed of acoustical tile. One would have to believe this factor a rarity in agricultural mechanics laboratories. The use of acoustical tile would appear to be a very good idea but the resulting data could be considered atypical. A more representative set of readings might have been collected at an area high school.

The dosimeter was attached in the welding booth during the period of data collection. If the students had worn the dosimeter during the entire class period, both in and out of the booth, a clearer picture of total noise exposure would be possible. It would be interesting to see if results are changed by moving to a different laboratory and allowing students to wear the dosimeter.

This study and studies like it are needed to help improve the working environment in agricultural mechanics laboratories as much for the instructors as for the students. This paper was well written and very clear. I commend Dr. Miller for his efforts.

ORGANIZATIONAL COMMITMENT OF AGENTS IN THE WEST VIRGINIA EXTENSION SERVICE

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Agriculture has always been one of the largest and most important industries in the United States. Congress recognized this by creating the Land-Grant Colleges in 1862 and Experimental Stations in 1884 in each state to better educate the people of rural America. The Cooperative Extension Service was formed with the passage of the Smith-Lever Act of 1914. This act states that the Extension service was "created to aid in diffusing among the people of the United States, useful and practical information on subjects related to agriculture and home economics and encourage application of the same" (Joint United States Department of Agriculture and National Association of State Universities and Land-Grant Colleges, 1983, p. 3).

An extension agent must be committed to his or her job to be totally effective. Mottaz (1986) asserts that "Recent studies indicate that organizational commitment may have consequences for job performance (Mowday, Porter, and Dubin, 1974; Porter et al., 1976; Steers, 1977), absenteeism (Smith, 1977; Steers, 1977), and turnover (Ham, Katerberb and Hulin, 1979: Porter et al., 1976; Koch and Steers, 1978; Angle and Perry, 1981). Thus, organizational commitment would appear to be related to organizational effectiveness" (p. 483). A committed agent will make an extra effort in order to disseminate the knowledge the people of America have the right to receive. Conversely, an agent with less organizational commitment may not want the added duties which the job entails.

Purpose of the Study

This study was conducted to determine the major factors related to organizational commitment among county agents in the West Virginia Extension Service(WVES). The study also sought to determine the level of commitment among agents in the WVES, the relationships between organizational commitment and job characteristics, and the relationship between organizational commitment and work experiences.

Methodology

Population

The population for this study consisted of county extension agents employed by West Virginia University from November 17, 1987 to January 25, 1988. Of the 119 agents surveyed, 113 (92 %) responded with usable questionnaires.

Design and Instrumentation

The descriptive method of research was used in this study to obtain the data necessary to answer the research objectives. Data were collected by mail questionnaires. The questionnaire included four main sections. The first section was designed to gather information on demographic antecedents; the second section consisted of ten statements that measured job characteristics; the third section consisted of 27 statements designed to measure work experiences; and the final section contained 15 statements which measured the respondent's level of organizational commitment. The statements were measured on a four point, Likert-type scale that ranged from strongly disagree (1) to strongly agree (4).

Validity and Reliability of the instrument

The main questionnaire was examined for content validity by faculty members at West Virginia University. The reliability of the Likert-type scale was established using Cronbach's alpha statistical techniques. The reliability coefficient for the instrument was .90.

Data collection

A questionnaire was mailed to all individuals in the population on December 15, 1987 with a cover letter signed by Dr. Rachel B. Tompkins, Associate Vice President for University Extension and Public Service. Of the population surveyed 113 (92 %) responded. Non-response bias was determined by comparing late respondents with early respondents. Responses were found to be similar.

Data analysis

Data were analyzed using the (SPSSX) Statistical Package for the Social Sciences, at the computer center facilities of West Virginia University. For each of the variables of this study, descriptive data were analyzed in the form of frequencies, percentages, and measures of central tendency. Data were recorded and presented in tabular form based on ranked means and standard deviations. A descriptive narrative was used in combination with the tabulated figures to explain and interpret the findings.

Correlational techniques were incorporated to establish the relationships between the antecedents and consequences. Pearsons Product Moment Correlational Coefficients or Point-biserial Correlation Coefficients were computed between each antecedent and the consequence; organizational commitment. The measure of relationships in this study were described based on the scale by Davis (1971).

Summary and Conclusions

Characteristics of the Population

The population for this study were the West Virginia Cooperative Extension agents employed by West Virginia University. Data were collected on the following variables.

Age

Over 50 % of the agents were under the age of 40. The mean age of the respondents was 41.81 with a standard deviation of 10.16. There was a moderate relationship (r = .34) between age and organizational commitment. This indicates that older agents are more committed to the West Virginia Extension Service than are younger agents.

Gender

Slightly over half of the respondents were female. The accessible population consisted of 57 females and 55 males. There was a negligible relationship (r = .06) between gender and organizational commitment. This indicates that males will be just as committed to the WVES as females.

Marital Status

Slightly over three-fourths of the respondents were married. It was suspected that married agents would have more organizational commitment than single agents. There was a low relationship (r = .25) between an agent's marital status and his/her level of organizational commitment. This indicates that married agents are no more committed to the WVES than single agents.

Tenure

The mean tenure was 13.78 years. The majority (61 %) of the county agents had 15 years or less experience in the extension service. Data show a low relationship (r = .22) between an agent's time in the extension service and his/her level of organizational commitment to the WVES. It can be concluded that there is little relationship between tenure and organizational commitment.

Major area of emphasis

As was suspected the majority of agents spent the major portion of their time dealing with 4-H, agriculture and forestry and home economics. This accounted for over 95 % of the responses. There was no relationship (r = .00) between an agent's major area of concern and his/her level of organizational commitment.

Education

Newly hired agents are required to have a Master's degree, thus a large portion of agents were expected to have a Master's degree. Slightly over three-fourths of the agent's surveyed did so. There was a negative negligible relationship (r = -.04) between the education level of an agent and the agent's organizational commitment to the WVES. It can be concluded that more education will not make agents more committed to the West Virginia Extension Service.

Major field of study

Slightly over three-fourths of the agents majored in either agriculture or home economics. There was a negligible relationship (r = .03) between an agent's college major and his/her level of organizational commitment. It can be concluded that regardless of an agents major in college, organizational commitment to the WVES remains constant.

State of origin

Slightly less than four-fifths of the agents who responded to the survey indicated that they were West Virginia natives. It was expected that West Virginians would show more commitment to the WVES than non-natives. There was a low relationship (r = .15) between an agent's place of origin and organizational commitment. This indicates that an agent that is native to West Virginia might be slightly more committed to the WVES than other agents but not appreciably.

Job Characteristics

Table 1

Summary Statistics for Job Characteristics

Variable	N	Mean	Standard Deviation	(r)
Job Autonomy	112	3.16	.48	.0050
Skill Variety	112	3.12	.57	.0636
Task Identity	112	3.03	.60	.0921
Feedback	112	2.31	.73	.2957

Rating Scale:

4. - Strongly Agree	2. - Disagree
3. - Agree	1. - Strongly Disagree

Job autonomy

Job autonomy refers to the amount of freedom agents have in carrying out their work. The mean response to questions regarding job autonomy was 3.14. Agents generally agreed that they had freedom in regard to their work. There was a negligible relationship (r = .01) between job autonomy and organizational commitment. It can be concluded that the amount of freedom an agent has on the job has little influence on the level of commitment towards the WVES.

Skill variety

The mean response to questions regarding skill variety was 3.12. Skill variety refers to the variety of different activities that are involved in carrying out an agent's work. The mean of 3.12 indicated that most agents agree that there is variety in their jobs. There was a negligible relationship (r = .06) between skill variety and an agents level of organizational commitment. It can be concluded that the variety in an agent's job has little impact on organizational commitment to the WVES.

Task identity

Task identity measures the degree to which the job requires completion of a work and is identifiable as an agent's piece of work. Overall, the mean response to task identity was 3.03. This indicates that most agents agree that they do identify a job as their own. Task identity had a negligible relationship (r = .09) with agents level of organizational commitment. It can be concluded that agent's with high levels of task identity were no more committed to the West Virginia Extension Service than were agents with low levels of task identity.

Feedback

Feedback can be defined as the degree to which agents obtain direct and clear information about the effectiveness of their performance. The overall mean for feedback was 2.31. This indicates that agents feel they are not getting sufficient feedback on their performance. There was a moderate relationship (r = .30) between feedback and organizational commitment. It can be concluded that agents tend to be more committed to the West Virginia Extension Service if they feel they are receiving an adequate amount of feedback on their job performance.

Work Experiences

First-year job challenge

First-year job challenge is the degree to which the job provides a substantial challenge or interest to agents during the first year of their service. The overall mean response by the county agents to job challenge was 3.07. Most agents felt that their jobs as extension agents were challenging. There was a moderate relationship (r = .39) between first-year job challenge and organizational commitment. It can be concluded that agents tend to be more committed to the West Virginia Extension Service if they perceived their jobs were challenging and interesting.

Peer group cohesion

Peer group cohesion is the feeling of closeness among agents. The overall mean response for peer group cohesion was 2.96. This indicates that agents feel a sense of companionship with other agents. There was a negligible relationship (r = .05) between peer group cohesion and organizational commitment. It can be concluded that a feeling of solidarity among agents has little influence on an agents level of commitment towards the WVES.

Personal importance

Personal importance is the extent to which agents feel that they are making significant and appreciated contributions to the organization. The overall mean response by agents was 2.79. Most agents agreed that they were making important contributions to the WVES. There was a substantial relationship (r = .52) between personal importance and organizational commitment. This is the strongest correlation found in this study. It can be concluded that agents who feel they are making important contributions to the WVES have a higher level of organizational commitment.

Table 2

Summary Statistics for Work Experiences

Variable	N	Mean	Standard Deviation	(r)
Job Challenge	111	3.07	.49	.3837
Peer Group Cohesion	113	2.96	.51	.0504
Personal Importance	113	2.79	.51	.5197
Self Image Reinforcement	113	2.78	.54	.4434
Realization of Expectations	111	2.71	.57	.3848
Group Attitudes	112	2.69	.51	.4490
Role Clarity	112	2.42	.77	.3831

Rating Scale:

4. - Strongly Agree	2. - Disagree
3. - Agree	1. - Strongly Disagree

Self image reinforcement

Self image reinforcement is the extent to which agents are encouraged to behave in ways that represent their true feelings and attitudes. The overall mean response by agents regarding self image reinforcement was 2.78. This indicates that agents generally agreed that they were encouraged to behave according to their true feelings. There was a moderate relationship (r = .44) between self image reinforcement and organizational commitment. It can be concluded that agents who feel they are encouraged to freely express their true attitudes are more likely to have higher levels of commitment to the West Virginia Extension Service.

Realization of expectations

Realization of expectations refers to how an agent's expectations of the job relates to what the agent found on the job. The overall mean response for realization of expectations was 2.71. This indicates that most agents felt that their expectations met what with what they found on the job. There was a moderate relationship (r = .38) between realization of expectations and organizational commitment. It can be concluded that agents who are aware of what is expected of them when entering the WVES will be more committed to the organization.

Group attitudes towards the West Virginia Extension Service

Group attitudes refers to the attractiveness of the work group towards the organization. The mean response by agents for group attitudes was 2.69. This indicates that most agents feel that other agents look positively upon the WVES. There was a moderate relationship (r = .45) between group attitudes and organizational commitment. It can be concluded that agents tend to be more committed to the WVES if they work with other agents who express positive attitudes towards the WVES.

Role clarity

Role clarity is the extent to which agents understand what they are supposed to do on the job. The overall mean response for role clarity was 2.42. This indicates that agents feel they do not adequately understand what is expected of them on the job. There is a moderate relationship (r = .38) between an agent's role clarity and the level of organizational commitment. It can be concluded that the more agents understand what is expected of them on the job, the higher the level of organizational commitment.

This study's findings were generally consistent with the findings of other researchers. The highest indicators of organizational commitment found in this study were personal reinforcement, group attitudes towards the WVES, self image reinforcement, first-year job challenge, realization of expectations, role clarity, feedback and age.

Recommendations

The following recommendations were suggested by the researcher based on the findings of this study.

1. This study should be replicated to determine organizational commitment by personnel in other areas of the extension service such as extension specialists and state administrators.
2. A study should be conducted to determine the relationship between organizational commitment and absenteeism and turnover among agents in the West Virginia Extension Service.
3. A study should be conducted using different variables which may relate to organizational commitment such as salary, central life interests and job satisfaction.
4. County extension agents should be made to feel they are making significant and appreciated contributions to the WVES. This could be done through the distribution of plaques, certificates, letters of recommendations or other appropriate recognition methods.
5. The extension service should make an effort to keep morale high among extension agents.
6. The WVES should encourage agents to express their true feelings and attitudes.
7. The WVES should design the agent's first year to be exciting and challenging.
8. County extension agents should be made more aware as what to expect during the first year of work.
9. Extension service job descriptions should be developed so that agents clearly understand their job responsibilities.
10. Agents should receive more feedback on their job performance from the West Virginia Extension Service.

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Organizational Commitment of Agents In the West Virginia Extension Service
A Critique

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The authors of this study should be applauded for many reasons. Most importantly, this is a subject of great importance to the profession. One of the conclusions suggesting that feedback is needed for the agents. As fundamental as this may seem this should not be overlooked.

The return rate for this study was excellent. This may be due in part to several factors mostly controlled by the researcher. The credibility of the study was enhanced by the choice of a research instrument with a .90 reliability factor.

A few areas of concern would include some of the interpretations of the correlations. Interpretive statements show some degree of inconsistency thus suggesting the possibility of researcher bias.

If the recommendations were provided to management, I'm sure many would feel that they are already incorporating most of them. In fact because of the vagueness it would be difficult to determine if they were or not. After a study of this high quality is completed, it is important that changes would result.

There are several illustrations of good wording leaving little possibility for misunderstanding. Thus, if desired, the study could be duplicated. There is a need for more studies on this same general topic.

PARTICIPATION AND PERSISTENCE IN CONTINUING LIFELONG LEARNING EXPERIENCES OF THE OHIO COOPERATIVE EXTENSION SERVICE: AN INVESTIGATION USING EXPECTANCY VALENCE

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INTRODUCTION

Lifelong learning is not a new concept but because the United States is rapidly becoming a nation of adults (in 15 years, the majority of Americans will be middle-aged) (Cross, 1983), the need to provide educational opportunities for continuing lifelong learners has never been as apparent as in these last decades of the twentieth century.

Not only will there be more adult learners, but they will exhibit different needs than previous populations of knowledge-seeking adults (individuals returning to the work force, those in need of retraining, displaced workers, women appearing in the job market for the first time, and adults simply struggling to keep up with life). These adult learners have a new set of needs and problems, thus providers of adult learning opportunities have never been a more needed, yet challenged, resource.

The Cooperative Extension Service is one of the largest adult education organizations in the world. Extension serves a diverse set of publics helping to develop a variety of individual skills that encourage personal growth through experiences, aid in attainment and refinement of problem-solving skills, and provide the acquisition of new information to be used in life-enriching activities (Rossano, 1985). In fact, enriching the quality of life through continuing lifelong learning opportunities has been the Extension mission since its inception in 1914.

A basic assumption in adult education and participation theory is that adult learners exhibit different characteristics from traditional students simply because they are adults. Regardless of the myriad of other reasons suggested to be related to participation in adult education programs, the simple fact that adults come with their own unique set of life experiences provides adult learners with a different set of criteria to be used in decision-making than that of traditional students. In addition, the adult individual is more capable of rational thinking and anticipating outcomes of participation and performance behavior than younger, more traditional students.

Theoretical Model

One approach to understanding the adult learner which fits well into these identified adult characteristics is the use of an instrumental theory of human motivation and participation because the theory emphasizes cognitive ability and individual characteristics and choices. The model emphasizes individual circumstances, abilities and traits, role perceptions, and future anticipated valued rewards (Vroom, 1964).

A more recent model using Vroom's (1964) original theory on motivation was directly applied to adult learning theory by Rubenson (1977). He developed a framework with expectancy/valence properties which attempted to account for the competing forces within individuals when making the decision to participate. Rubenson's model de-emphasizes external barriers to participation and emphasizes the internal motivational factors at work in the participation phenomenon. In a sense, the model is taking a positive rather than negative approach to participation. External barriers are included in the model, however, Rubenson rather implicitly suggests that real barriers are not important; perceptions of barriers are the factors influencing participation.

Rubenson's model served as the inspirational framework for the study which investigated the process by which an adult learner chooses to participate in an educational program.

Encouragers and Barriers to Participation

A number of authors (Scanlon, 1986; Johnstone & Rivera, 1965; Larson, 1980; Darkenwald, 1980; Boshier, 1971; Houle, 1961) have identified categories of factors that act as barriers or encouragers to adult participation. Johnstone and Rivera (1965) used terms such as situational barriers (time, money, child care, transportation, weather), institutional barriers (factors pertaining to the educational service provider), sociodemographic barriers (age, sex, race, income, educational level, and geographic location) and dispositional factors (self-esteem, group participation) in describing adult responses.

Burgess (1971) identified several characteristics of adults who choose to participate in the learning experience: (a) they have a desire to know; (b) they have established personal, social or religious goals; (c) they are engaged in some activity; (d) they need to meet a formal, work-related requirement; and (e) they simply have a desire to escape. Boshier (1971) mentioned the desire to improve one's ability to serve the community, the need to make new friends, intellectual recreation, professional advancement (either job related or inner-directed), an abhorrence of television, the joy of learning, an introduction or supplementation of understanding, and escape.

Other authors have identified specific factors related to participation such as: involvement with a formal organization which encouraged adult participation (Darkenwald & Merriam, 1982), people with broad and diverse leisure activities are more likely to participate in adult educational activities (London, Wenkert, & Haggerstrom, 1963), and individuals with high levels of income are more likely to become involved with additional educational experiences (Johnstone & Rivera, 1965). Situational barriers such as child care, shift or overtime work, lack of transportation, poor health and lack of time or money are particularly a problem for low socioeconomic adults and the elderly than the average middle-class adult. Institutional barriers (inconvenient class schedules, full-time fees for part-time study, restrictive locations and the like) often exclude or discourage certain groups of learners such as the poor, the undereducated and the foreign born. In addition, adults living in certain geographic areas are less likely to participate in educational opportunities, especially those living in small towns and rural areas (Johnstone & Rivera, 1965).

In summary, there have been a multitude of studies which have tried to identify specific categories of barriers and motivators to participation. Very few studies have looked at how factors may take on both the role of the barrier and the encourager depending on how the individual perceives it.

PURPOSE AND OBJECTIVES

This study of adult participation in Extension educational programs was based on three philosophical tenets: 1) Adult learners are more capable of rational thinking and anticipating outcomes of participation and performance behavior than younger, more traditional students, thus the choice of an integrated model of human motivation to guide the study; 2) Individual differences act upon that decision-making process to alter perceptions of encouragers and barriers to participation and persistence so that different groups of learners perceive factors differently; 3) Factors which influence the decision to participate may be different than factors which influence the decision to persist through an educational program.

The major purpose of the study was to investigate tenets 2 and 3 with specific focus on the differences between factors affecting participation versus persistence and in turn how those factors affected satisfaction (one important, desired end result in adult participation). Research questions used to guide the study included:

1. What are the factors (barriers/encouragers) that are related to participation and persistence?

2. Are those factors different for the decision to participate and the decision to persist?

3. What are the outcomes of participation and persistence?

4. What are the best predictors of satisfaction with participation and persistence?

PROCEDURES

This study was correlational allowing the researcher to investigate relationships between variables.

Population

The target population was Ohio Cooperative Extension Service (OCES) adult clientele who had participated in any multi-session Extension program during 1986-87 (estimated N = 20,000). Lists of clientele participating in multi-session programs were solicited from all county agents in Ohio. A total of 599 names were offered and this list became the sample. An extensive demographic comparison between the sample and the target population was conducted to help alleviate external validity threats (see discussion in data collection).

Instrumentation

The instrument used to gather data was a mail questionnaire with two forms: one used to collect data on the decision to participate and the other used to collect data on the decision to persist. The instruments were field-tested for content validity. Construct validity was confirmed using factor analysis. Cronbach's alphas of factors ranged from .73 to .92. Likert-type items used to measure barriers/encouragers (51 items) were scaled 1 to 7. Outcomes were measured using a similar 4-point scale (25 items) and satisfaction was a simple 5-response choice item.

Data Collection

Data were collected during Autumn 1987 following the Dillman procedure for mail questionnaire administration (1978). The sample was randomly divided into two groups; one received the "participate" questions, the other, the "persist" questions. All answered the outcomes and satisfaction information.

A total data sample of 276 (46%) was obtained. This number included 114 who attended agricultural-related programs, 52 from home economics, 5 from 4-H, 27 from community and natural resource development and 81 who listed "other" types of programs. A follow-up telephone interview was conducted with a random sample of 10% of the non-respondents; no differences were found, thus, results were generalized to the entire sample of 599. Readers may want to consider the non-randomness of the total sample before generalizing to the target population even though, based on demographic comparisons, there is little reason to believe that the sample is not representative of the target population.

ANALYSIS OF DATA

Analysis using principal-component factor analysis on the SPSS-X statistical package was used to identify factors related to participation and persistence as well as to reduce outcome items to meaningful factors. Orthogonal varimax rotation of the matrix was used to increase interpretability of the factors. To identify factor components, factor loadings of .5 and greater were included. Multiple regression and simple Pearson correlation coefficients were used to determine relationships between variables and best predictors.

RESULTS

Five factors emerged which related to the decision to participate: anticipated quality of information, anticipated social involvement, anticipated difficulties with arrangements, commitment to the organization (OCES), and internal motivation (total variance explained = 58.6%) (Table 1). With the exception of commitment, these factors are consistent with previous research; the commitment factor appeared to be unique to the Cooperative Extension Service. The factor rated the highest in encouragement was the anticipated quality of the information ($\bar{x} = 5.85$, sd = .80) but means of all five factors were between 5 and 6 on the 7-point scale. The factors which related to the decision to persist (not drop out) were essentially the same as those related to participation, but the commitment factor was replaced by the quality/personality of the teacher (55.9% of the variance explained) (Table 2). This finding might suggest that the individual transfers the initial commitment from the organization to the teacher after becoming involved. The factor which appeared to be the most encouraging to persistence was also the quality of information ($\overline{x} = 6.17$, sd = .66). The mean scores went as low as 5.05 (the social factor mean).

Three factors emerged which related to actual outcomes of participation and persistence in a program: negative experiences, self-improvement, and social involvement (total variance explained = 48%) (Table 3). The inference was that even though individuals participated and persisted partially because they needed the information, the outcomes they received were more closely related to the actual experiences they had and the internal reward of self-improvement. Means for these three factors (on a 4-point scale) were 3.24 (sd = .41), 3.05 (sd = .33) and 1.82 (sd = .40), respectively.

The stepwise multiple regression produced four factors as the members of the set of best predictors, accounting for 22% of the variance in the satisfaction measure: "self-improvement" outcomes factor (13%), the decision to participate "arrangements" factor (4%), the decision to persist "teacher" factor (3%), and the "negative experiences" outcomes factor (2%). The model appeared as follows: $y' = .234 + .139x_1 + .062x_2 + .048x_3 - .069x_4$ (Table 4).

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, the following conclusions and recommendations were made:

1. Most factors which related to participation and persistence appeared to be the same (information, social, arrangements, internal motivation); thus, the Ohio Cooperative Extension Service (OCES) and similar organizations should market educational programs emphasizing these components (to encourage participation) and should be sure to incorporate them into the programming effort (to encourage persistence).

2. A factor encouraging initial participation and appearing to be unique to Cooperative Extension Service was that of commitment to the organization (known by its reputation). The OCES should concentrate marketing efforts to include this quality reputation.

3. Individuals are most satisfied when they experience self-improvement, do not have negative learning experiences, have the initial worry of arranging participation solved, and like the teacher. Because satisfaction with participation is one clear indicator of continued involvement in lifelong learning activities, the best predictors for this study's population should be noted and highlighted in the planning and conducting of future programs for similar audiences.

4. Even though the sample for this study appeared to be representative, a replication using truly random procedures could better explore possible hypotheses suggested by the results of this study.

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TABLE 1

FACTOR ANALYSIS SUMMARY FOR THE DECISION TO PARTICIPATE

Factor[a]	X	sd	# of Items[b]	Eigen Value	% of Variance
Information	5.85	.80	5	9.75	34.8
Social	5.69	.86	5	2.09	7.5
Arrangements	5.71	.89	4	1.82	6.5
Commitment to Organization	5.37	.86	4	1.44	5.1
Internal Motivation	5.36	.88	4	1.32	4.7
					58.6

[a] Factor loadings < .50 were omitted.

[b] Items with NA > 25% were removed from analysis.

(Rotated factor matrix varimax converged in 17 iterations)

TABLE 2

FACTOR ANALYSIS SUMMARY FOR THE DECISION TO PERSIST

Factor[a]	X	sd	# of Items[b]	Eigen Value	% of Variance
Teacher	5.94	.88	5	9.91	31.0
Internal Motivation	5.66	.81	5	2.74	8.6
Information	6.17	.66	5	2.27	7.1
Social	5.05	.91	4	1.67	5.2
Arrangements	5.57	.96	3	1.28	4.0
					55.9

[a] Factor loadings < .50 were omitted.

[b] Items with NA > 25% were removed from analysis.

(Rotated factor matrix varimax converged in 13 iterations)

TABLE 3

FACTOR ANALYSIS SUMMARY FOR OUTCOMES

Factor[a]	X	sd	# of Items[b]	Eigen Value	% of Variance
Negative Experiences	1.82	.40	8	6.37	33.5
Self-Improvement	3.24	.41	5	1.65	8.7
Social Involvement	3.05	.33	4	1.09	5.8
					48.0

[a] Factor loadings $< .50$ were omitted.

[b] Items with NA $> 25\%$ were removed from analysis.

(Rotated factor matrix varimax converged in 9 iterations)

TABLE 4

REGRESSION OF SATISFACTION WITH PARTICIPATION ON SELECTED VARIABLES (Stepwise Entry)

Independent Variables Entered Stepwise in Equation	Multiple R	R^2	R^2 Increment	b	F
Self-Improvement Outcomes Factor	.3667	.1344	.1344	.139	46.75*
Decision to Participate - Arrangements	.4180	.1747	.0403	.062	31.76*
Decision to Persist - Teacher	.4503	.2028	.0281	.048	25.35*
Negative Outcomes Factor	.4704	.2213	.0185	-.069	21.17*
(Constant)				(.235)	

*$p < .05$

$Y' = .235 + .139X_1 + .062X_2 + .048X_3 - .069X_4$

PARTICIPATION AND PERSISTENCE IN CONTINUING LIFELONG LEARNING EXPERIENCES OF THE OHIO COOPERATIVE EXTENSIVE SERVICE: AN INVESTIGATION USING EXPECTANCY VALENCE

A CRITIQUE

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When I first read the long and cumbersome title of this paper and tried to make some connection to my current store of knowledge -- I drew a blank. But I'm pleased to report that my interest was positively intensified through the reading of the introduction and literature review. I commend Dr. Van Tilburg on a logical study and a well-written paper, especially the introduction and literature review sections. The need for addressing life-long learning will increase as our population ages.

I have only a few points for discussion. Dr. Van Tilburg states that Rubensen's model served as an "inspirational" framework for the study. All of us should become more inspired from the study of theories. On page two she states that "Rubensen rather implicitly suggests that real barriers are not important; perceptions of barriers are the factors influencing participation." My first reading of this statement led me to agree, but with more reflection I found it increasingly difficult to understand the distinction between the "real" and "perceived" barriers. When a barrier is perceived by an adult learner, doesn't that barrier become real to that person? Weren't all of the studies referenced in the literature review measuring perceptions of reality -- be they a positive or negative perception? It would have helped me to have more discussion explaining how this study addressed the perceived versus real barriers.

The explanation of the population and sample was clear and a well-balanced discussion about the relationship between the sample and target population was provided. Instrumentation, data collection, and analysis procedures were well designed and explained.

The results section was somewhat abbreviated and probably suffered from prescribed limitations on the paper's length. I was surprised that there were only minor differences between the factors related to respondent decisions to participate and those factors that are related to persistence. Is this consistent with previous research? Dr. Van Tilburg inferred that individuals participated because they needed information, but the outcomes were more related to the actual experiences they had and the internal reward of self-improvement. I would have appreciated a more thorough discussion of any implications/recommendations for Extension programming related to this inference.

PERCEPTIONS OF ADMINISTRATORS AND INSTRUCTORS CONCERNING FACTORS INFLUENCING VOCATIONAL AGRICULTURE ENROLLMENT

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INTRODUCTION

Vocational agriculture has, historically, been a part of the comprehensive secondary educational system and has been accessible to all that needed or could benefit from its instructional program. The providers of vocational agriculture have been committed to a quality program of education in agriculture. However, the effectiveness and efficiency of vocational agriculture programs to provide appropriate and relevant education in agriculture will be greatly impacted by a significant decline in student enrollment.

The 1986 report Future Directions for Secondary Agricultural Education in Idaho included the following:

> There is a steady decline in the level of funding for secondary Agricultural Education programs from the federal level. The depressed economy and growing distrust of public education is causing a shortage of funding for education in general. This increases the possibilities of year-round secondary agricultural education programs being shortened or eliminated. (p. 10)

New standards in education, a result of the Excellence in Education movement, require that high school students face more stringent graduation and college entrance requirements, thus limiting options and possibly limiting enrollment in vocational agriculture classes.

Effective fall 1984, secondary students in Idaho who graduate in 1988 and thereafter will be required to complete a 14 credit core and maintain a composite grade average of C. No student is eligible for credit in a class unless the student is present 90 percent of the occasions the class is in session (A Report to the Idaho State Board of Education from the Commission on Excellence in Education, 1982). These standards came at a time when many vocational agriculture programs were already facing declining enrollments and in some cases closure.

While the results of the Excellence in Education movement may have the predicted impact on vocational agriculture enrollments, time must pass before the impact can be measured. However, vocational agriculture enrollments had been declining before the movement became a reality. Logic would dictate other factors were already having an influence.

If vocational agricultural education is to survive as an element in the educational community it will require steady supply of qualified students to maintain program vitality. However, there has been a decline of 471 students in 75 Idaho vocational agriculture programs between the 1979-1986 academic years, a decrease of more than 14 percent.

A review of the literature (mostly opinion articles by agricultural educators) identified the following factors as having a limiting influence on vocational agriculture enrollment on a national basis:

1. Vocational agriculture classes continually face scheduling in the school day opposite required courses.
2. Vocational agriculture classes are facing more competition for students from other elective courses.
3. High school students are participating more in sports activities and therefore do not have the time to devote to vocational agriculture.
4. Academically oriented students are being guided away from enrollment in vocational agriculture.
5. Vocational agriculture is used by schools as a "dumping ground" for low achieving students.
6. Vocational agriculture demands too much of a student's time.
7. Vocational agriculture requires students to have a SOEP.

8. More of the student population is living in urban areas.

9. Potential students do not have an accurate or adequate knowledge of the content and benefits of vocational agriculture.

10. Students lack exposure to a variety of jobs that require or utilize skills that are a part of the vocational agriculture curriculum.

11. Students have changed considerably in their interests and their attitude toward agriculture.

12. The traditional facilities of vocational agriculture have a limiting effect on enrollment.

13. The tools and equipment of many vocational agriculture programs are inadequate and therefore limit enrollment.

The above factors were touted, on a national basis, as limiting vocational agriculture enrollment; what effect were these factors having on the enrollment of vocational agriculture in Idaho? The most knowledgeable individuals about factors affecting enrollment in a particular vocational agriculture program are the instructor and the school administrator directly responsible for the program.

The determination of the perceptions of the vocational agriculture instructors and administrators toward the influence of the above factors on the vocational agriculture enrollment in their school formed the basis of this study.

PURPOSE AND OBJECTIVES

The purpose of the study was to determine the contribution of selected factors to the decline in enrollment in secondary vocational agricultural education programs in Idaho. The specific objectives of the study were to:

1. Determine the perceptions of Idaho secondary school administrators and vocational agriculture instructors toward the influence of selected factors on secondary vocational agriculture enrollment.

2. Identify the differences between the perceptions of administrators and vocational agriculture instructors toward the influence of selected factors on secondary vocational agriculture enrollment.

PROCEDURES

The population for this descriptive study consisted of 75 administrators and 81 vocational agriculture instructors from schools in Idaho that offered vocational agriculture during the 1986-87 academic year. Because of the small number of vocational agriculture programs in Idaho, the entire population was used for the study. Usable data were received from 73 administrators and 78 vocational agriculture instructors, resulting in an overall response rate of 96.5 percent.

A self-administered, fixed response mail questionnaire was used to elicit responses from administrators and instructors. A follow-up postcard was mailed to all administrators and instructors reminding them of the importance of their response to the study. A second and third follow-up letter and instrument were mailed to administrators and instructors who had not returned a previous instrument.

The reliability coefficient (Cronbach's alpha) of the response scales used with the variables reported in this study was estimated as alpha = 0.79.

Data were analyzed using the Statistical Package for Social Sciences (SPSSx, Version 2.1), with subprograms, Frequency, Friedman's Two-way ANOVA, and Wilcoxon's Matched-pairs Signed-rank test. Non-parametric statistical tests were used to analyze the data of this study because the data were collected using a 4-point scale and, therefore, the data were measured at the ordinal level and did not satisfy the requirements for parametric tests.

FINDINGS

The administrators and vocational agriculture instructors were asked to indicate the extent each of the selected factors limited the vocational agriculture enrollment in their school. The response categories provided were seriously limiting, moderately limiting, slightly limiting and not limiting.

Table 1 lists the factors, in an abbreviated form, and the percentage of respondents selecting each of the response categories. The mean rank, derived from Friedman's 2-way ANOVA, was used to order the factors from most limiting to least limiting.

Table 1. Selected factors and their limiting effect on secondary vocational agriculture enrollment as perceived by administrators and instructors.

Factors	Mean Rank	Seriously Limiting	Moderately Limiting	Slightly Limiting	Not Limiting
Scheduling conflicts	4.25*	26.8**	39.5	24.8	7.6
Change in students' interests & attitudes toward agriculture	4.50	23.6	36.9	29.3	8.9
Competition with other electives	4.50	23.6	37.6	28.7	8.3
Academically oriented students guided away from vo ag	5.71	22.3	26.1	26.8	23.6
Inadequate student knowledge/image of vo ag	6.78	12.1	22.3	36.9	28.0
Students lacking exposure to jobs requiring vo ag skills	7.26	8.3	21.0	42.0	28.0
Demand on students' time	8.01	3.8	16.6	42.7	34.4
Student participation in sports	8.18	6.4	17.8	28.7	42.7
Students required to have SOE	8.46	1.9	15.9	41.4	39.5
Vo ag used as "dumping ground"	9.11	3.2	10.8	33.1	50.3
Inadequate tools & equipment	9.29	1.3	9.6	35.0	52.9
Limited vo ag facilities	9.38	3.2	10.8	26.8	58.6
Students live in urban areas	9.42	1.9	12.7	26.8	58.0

* From Friedman's Two-way ANOVA, 1 = Seriously Limiting, 2 = Moderately Limiting, 3 = Slightly Limiting, 4 = Not Limiting

** Percent of Total Responses

Over 60 percent of the respondents indicated scheduling conflicts, change in students' interests and attitudes toward agriculture and competition with other elective courses moderately to seriously limited vocational agriculture enrollment at their school.

The respondents' indications of the limiting influence of the factor of academically oriented students being guided away from vocational agriculture were almost equally divided among the 4 response categories.

Over 65 percent of the respondents indicated the factors of inadequate/inaccurate student knowledge or image of vocational agriculture, students lacking exposure to a variety of jobs requiring or utilizing vocational agriculture skills, the demand of students' time by vocational agriculture and students participation in sports as slightly to not limiting on vocational agriculture enrollment in their schools.

Finally, over 80 percent of the respondents indicated the factors of vocational agriculture requiring students to have a SOEP, vocational agriculture used as a "dumping ground", inadequate tools and equipment, limited facilities and students live in urban areas as not limiting to slightly limiting vocational agriculture enrollment in their schools.

To determine if the responses of the administrator and instructor of a particular school were significantly different, the statistical test, Wilcoxon's Matched-pairs Signed-rank, was applied to the responses as summarized in Table 1.

Table 2 lists the results of the Wilcoxon test. The test determined the number of cases (schools) in which the instructor rated the factor as more limiting than did the administrator, the number of cases (schools) in which the administrator rated the factor as more limiting than did the instructor, the number if cases (schools) in which the ratings of the instructor and administrator were tied, the computed Z-score and the probability of that Z-score being due to chance or error.

Table 2. The difference in perception between administrators and instructors toward the influence of selected factors on vocational agriculture enrollment as tested by Wilcoxon's Matched-pairs Signed-rank Test.

	Number of Cases Factor Rated More Limiting by				
Factors	Instructor	Administrator	Ties	Z-score	Probability
Vo ag used as "dumping ground"	47	4	21	-5.5585	.0000 *
Inadequate student knowledge/image of vo ag	50	6	19	-5.5550	.0000 *
Student participation in sports	40	10	20	-3.8372	.0001 *
Academically oriented students guided away from vo ag	43	14	17	-3.7581	.0002 *
Scheduling conflicts	37	10	27	-3.5662	.0004 *
Students live in urban areas	24	11	40	-2.5470	.0109 *
Students lacking exposure to jobs requiring vo ag skills	31	15	29	-1.8027	.0714
Change in students' interests & attitudes toward agriculture	24	20	30	-1.1553	.2479
Limited vo ag facilities	25	13	37	-1.1312	.2580
Students required to have SOE	30	21	23	-1.0451	.2960
Inadequate tools & equipment	25	21	29	-1.0434	.2968
Competition with other electives	23	22	28	-0.4007	.6886
Demand on students' time	27	20	25	-0.2540	.7995

* Significant difference in response pattern with $p \leq .05$

The administrators and instructors differed significantly in their responses to 6 of the 13 factors: scheduling conflicts, academically oriented students being guided away from vocational agriculture, inadequate/inaccurate student knowledge/image of vocational agriculture, student participation in sports, vocational agriculture used as a "dumping ground" and students live in urban areas. In each instance the instructors rated the factor as more limiting to vocational agriculture enrollment than did their administrators. The ratio of the number of cases in which the instructor rated the factor more limiting than did the administrator to the number of cases in which the administrator rated the factor as more limiting than did the instructor ranged from 2:1 for the factor of students live in urban areas to 11:1 for the factor of vocational agriculture is used as a "dumping ground".

CONCLUSIONS

The 13 factors, identified from the literature as limiting vocational agriculture enrollments, were rated significantly differently as to their effect by the respondents of this study, Idaho secondary school administrators and vocational agriculture instructors.

The 4 factors rated as having the most limiting effect on vocational agriculture enrollment were: scheduling conflicts, change in students' interests and attitudes toward agriculture, competition with other elective courses and academically oriented students guided away from vocational agriculture.

The 5 factors rated as having the least limiting effect on vocational agriculture enrollment were: vocational agriculture requiring students to have a SOEP, vocational agriculture used as a "dumping ground", inadequacy of vocational agriculture tools and equipment, limited facilities for vocational agriculture students and students live in urban areas.

The administrators and instructors rated 4 factors as having an intermediate (as compared to the two groups of factors cited above) limiting effect on vocational agriculture enrollment. The factors were: inadequate/inaccurate student image/knowledge of vocational agriculture, students lacking exposure to variety of jobs that require/utilize vocational agriculture skills, the demand on students' time by vocational agriculture and student participation in sports.

While the above conclusions are accurate and revealing, the data was analyzed further to fully draw out the perceptions of the administrators and instructors. Administrators and instructors rated 6 of the 13 factors significantly different.

Of the group of factors rated as most limiting, administrators and instructors differed in their ratings of the factors of scheduling conflicts and academically oriented students guided away from vocational agriculture.

Of the group of factors rated as least limiting, administrators and instructors differed in their ratings of the factors of vocational agriculture used as a "dumping ground" and students live in urban areas.

Of the group of factors rated as intermediately limiting, administrators and instructors differed in their ratings of the factors of inadequate/inaccurate student knowledge/image of vocational agriculture and student participation in sports.

On the factors that administrators and instructors differed in their ratings, instructors rated each of the factors as more limiting than did the administrators by ratios of 11:1 to 2:1.

RECOMMENDATIONS

The following recommendations, based on the findings of this study, should be given consideration by teacher educators, administrators, and instructors having responsibility for secondary vocational agricultural education.

1. Administrators and instructors should investigate the reason(s) their perceptions of the limiting effect of 6 of the 13 factors; scheduling conflicts, academically oriented students guided away from vocational agriculture, inadequate/inaccurate student knowledge/image of vocational agriculture, student participation in sports, vocational agriculture used as a dumping ground, and students living in an urban area, are so different. It would seem reasonable to expect an administrator and an instructor from the same school to have like perceptions of the limiting effect of those particular factors.

2. Research should be conducted to quantify the actual limiting effect of the factors: scheduling conflicts, change in students' interests and attitudes toward agriculture, competition with other elective courses and academically oriented students guided away from vocational agriculture. While

administrators and instructors differed in their opinion of the limiting effect of these factors, both groups had rated the 4 as the most limiting.

3. Research should be conducted to determine the perception of students currently enrolled and not enrolled in vocational agriculture toward these same factors and their effect on vocational agriculture enrollment.

4. Research should also be conducted to determine the perception of community leaders and school patrons toward these factors and their effect on vocational agriculture enrollment.

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PERCEPTIONS OF ADMINISTRATORS AND INSTRUCTORS CONCERNING FACTORS INFLUENCING VOCATIONAL AGRICULTURE ENROLLMENT

A CRITIQUE

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This research addressed the concern of declining vocational enrollments by identifying the causes as perceived by administrators and instructors in Idaho. The total population of vocational agriculture programs in 1986-87 was included in the study.

Strengths

1. The research topic is relevant and timely to agricultural education as we face decreasing enrollments. The introduction provides a concise and appropriate rational for consideration of the topic.

2. The literature was used to identify the factors to be included in the questionnaire.

3. Excellent follow-up procedures were used to generate a very high response rate which is important in survey research.

Weaknesses

Realizing the limitations imposed by the length of the paper, many of the items addressed here may be clarified in the presentation or the complete report of the project.

1. It is important to identify the positions of the administrators in the schools rather than using such a broad term.

2. A test for validity of the questionnaire was not reported on but is as important as reliability. The factor "inadequate student knowledge/image of vo ag" may not be valid since it could provide two different answers.

3. The population was not identified that was used to test the reliability of the questionnaire. Was it similar to the population of the study? Was a reliability determined for each factor since the analysis was by factors? Were a number of statements included with each factor in the questionnaire to provide for reliability of each factor?

4. Because the total population of vo ag teachers was used in the study, the statistical tests used were not needed to analyze the data. The use of frequency counts and measures for central tendency would have been appropriate to identify the differences between the two groups and the differences among the factors.

Recommendations

A recommendation which seems needed since differences were found between the perceptions of vo ag instructors and their administrators would be to identify ways to produce greater agreement. One or both may not understand the problem as it exists.

PERCEPTIONS OF SECONDARY AGRICULTURAL SCIENCE TEACHERS TOWARD PROPOSED CHANGES IN AGRICULTURAL CURRICULA IN TEXAS

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INTRODUCTION

Vocational agriculture has witnessed several changes in the industry it serves since the passage of the Smith-Hughes Act in 1917. However, at no time in history has change in agriculture been more rapid than it is now. Agriculture is in the midst of a technological revolution which promises to bring drastic changes. Coupled with technological advancements, economic problems have plagued farmers during the past decade, forcing many to abandon production agriculture. Burton (1986) stated that less than 3 percent of today's labor force are farmers, but more than 20 percent of U.S. workers are employed in agriculturally related careers. Vocational agriculture must address its place in this changing picture, including what the curricula should encompass to best serve students entering the program.

Another challenge facing vocational agriculture has come about as a result of the "back to the basics" movement, epitomized by A Nation at Risk (The National Commission on Excellence in Education, 1983). This report called for stricter graduation requirements, emphasizing additional English, mathematics, science, and foreign language studies. School curricula across the nation have been changed to reflect the recommendations of this report.

What does all this mean for vocational agriculture? Students enrolled in the program can no longer be assured of a career in production agriculture; instead, they may need to look to agribusiness for employment. Because of the increasing number of required courses for high school graduation, students often do not have time in their schedules for vocational agriculture. Enrollment in vocational agriculture nationwide has dropped at an alarming rate during the past decade--from 695,850 in 1975-76 to 525,071 in 1985-86 (National FFA Organization, 1986). Eudy (1986) cited these facts as a mandate for changes in vocational agriculture curricula in Texas if the program is to survive.

Agricultural educators in Texas recently began work to revitalize curricula in vocational agriculture. In 1986, "Vocational Agriculture" was renamed "Agricultural Science," a change to relieve some of the negative reaction toward the term "vocational." More importantly, educators began to restructure courses for students interested in agriculture. Semester courses (Texas Education Agency, 1987a), which would allow the student to specialize in one area of agriculture or to gain a wide range of experiences as a preparation for college studies, were proposed to replace Production Agriculture I, II, III, and IV (Texas Education Agency, 1968). The semester courses would de-emphasize the production agriculture aspect, while increasing instruction in agribusiness and emerging technologies associated with agriculture. The major question now is, "How do the instructors, perhaps not directly involved with the change process, view the proposed changes?" Do they see the need for change? Are the changes viewed as threatening?

Change is an aspect of life that all individuals face. Rarely does change from a familiar means of operation occur without resistance and, in some cases, open rebellion. But are there times when resistance to a change might be more common, and even predictable? Bennis, Beene, and Chin (1976) identified six instances in which change could be predicted to be resisted: (a) if the nature of the change is not made clear to the people who are going to be influenced by the change, (b) when different people will see different meanings in the proposed change, (c) when those influenced are caught in a jam between strong forces pushing them to make the change and strong forces deterring them against [sic] making the change, (d) to the degree that the persons influenced by the change have pressure put upon them to make it, and will be decreased to the degree that these same persons are able to have some "say" in the nature or direction of the change, (e) if the change is made on personal grounds rather than impersonal requirements or sanctions, and (f) if the change ignores the already established institutions in the group. (pp. 544-546)

So, resistance is most likely to occur when those being affected by the change are not included in the process, and when change is mandated. In the business world, change usually comes from internal forces. However, as Zaltman (1973) cited, this is not the case in education:

> Changes tend to be forced upon professional personnel (in education) rather than generated by them, as is more typical in other fields, not because educators are less competent or less committed to change but for the basic reason that education is more closely intertwined with and controlled by society itself. (p. 260)

Deal and Nutt (1979) cited the following "pitfalls of change" within school systems and with which those involved in the process may have to deal: (a) The introduction of change may create or intensify conflict among students, teachers, and administrators; (b) The morale of many administrators or teachers may drop, and some may leave--voluntarily or otherwise; (c) Conflict may intensify between the local community--parents or residents--and the district or school. Community members will become more vocal, and attendance at school board meetings may increase; (d) The willingness of the local community to support schools may wane, and tax and bond levies will likely be defeated; and (e) The change may not be implemented as planned, and is likely to fall considerably short of the intended mark even though some unintended consequences may result. (p. 3)

When change is needed, it is important to gain acceptance from those affected as quickly and as efficiently as possible. It is important to know what causes a person to adopt a change. George and Rutherford (1978) determined that adoption of an innovation could be predicted based on the individual's concerns about the innovation. The more concerned about the change or innovation, the higher the chance that the individual will in fact choose to adopt rather than reject. Pierce (1981) cited age, education level, and support of administration as being major influencing factors affecting a teacher's acceptance or rejection of innovative practices. He found that younger teachers, those with higher levels of education, and those whose administration exhibited support for the innovation were more likely to be adopters of change and innovations. George and Rutherford (1980) determined that the single most effective means of increasing concerns for a proposed change was through the use of training workshops. Training workshops allowed those considering adoption of an innovation the opportunity to ask questions and interact with others considering the change. It also allowed those supporting the innovation to discuss why it was important that it be adopted. Darr (1985) stated that teachers considering curriculum changes were concerned with how it would be better than what they had at the present, what other teachers were doing, how it would affect their current role, what time commitments would need to be made to adopt the new curriculum, and what effect the new curriculum would have on their current teaching practices. These types of concerns could be addressed at training workshops about proposed curricular change. These means (training workshops) were employed by staff of the Texas Education Agency in their efforts to gain support for the new curricula proposed for agricultural science. Ten workshops concerning the new curricula were held across Texas during the summer of 1987.

Purpose and Objectives of the Study

The purpose of the study was to determine if relationships existed between characteristics of agricultural science teachers and of their current programs, and perceptions of the teachers toward proposed changes in agricultural science curricula in Texas. The objectives were as follows:

1. To determine perceptions of teachers toward the proposed changes in agricultural curricula.
2. To determine if relationships exist between teacher/program characteristics and teachers' perceptions of proposed curricular changes.
3. To determine if relationships exist among perceived effects of curricular changes, "free choice" decision to change program, and "actual decision" to change program.

METHODOLOGY

To accomplish the objectives of this study, an ex post facto research design was employed. This design was used both to describe the present situation and to help in explaining why the situation existed (Borg & Gall, 1983).

Source of the Data

Because the study dealt with current changes taking place in curricula of agricultural science programs in Texas, the population for the study was limited to secondary teachers of agricultural science during the 1987-88 school year. The study was conducted by surveying those teachers in attendance at the opening meeting of the State Professional Improvement Conference for Teachers of Agricultural Science, August 12, 1987, Houston, Texas. The number of teachers in the population to be studied was 1,415 (Texas Education Agency, 1987b). During the opening general session of the conference, 933 teachers were surveyed. This sample was used to measure the perceptions of teachers toward the changes in curricula (Krejcie & Morgan, 1970).

Instrumentation

The questionnaire used for this study consisted of three parts. The first section contained questions pertaining to teacher perceptions of the proposed changes taking place in the agricultural science curricula. The second part was designed to collect data on personal and situational characteristics (e.g., age, sex, degrees held, number of years teaching, size of program). The final portion of the questionnaire consisted of two questions concerning what the teacher would do with "their curriculum" (a) if the choice were left up to them, and (b) for the upcoming school year (1987-88). For each of these questions the respondents were asked to make one of the following choices: (a) teach current ("old") curriculum, (b) adopt the new curriculum partially, or (c) adopt the new curriculum completely.

In part one of the questionnaire, teachers responded to 35 statements, indicating the extent to which they agreed or disagreed with each statement. A five-point, Likert-type response scale was employed for measurement purposes (Likert, 1932; Edwards, 1957); with "1"=strongly disagree, "2"=disagree, "3"=neither agree nor disagree, "4"=agree, and "5"=strongly agree. Twenty-six of the 35 statements suggested possible effects of curricular changes on the program of vocational agriculture. Nine statements elicited the opinion of teachers concerning the methods used to bring about the change. Conceptually, items were grouped into six major "concerns" in agricultural science and one concern dealing with the change process employed. Then, responses to individual items were summed to develop the following scales labeled as follows: Perceptions of teachers regarding effects of curricular changes on (a) enrollment in agricultural science, (b) non-vocationally oriented students, (c) FFA, (d) SOEP, (e) program administration, and (f) teacher inservice needs. Perceptions of teachers regarding the methods used to bring about the changes in curricula comprised the final scale. The individual items and "summative" scales were developed and validated by the researcher, four faculty members, and five graduate students in the Department of Agricultural Education. The questionnaire was approved by the researcher's graduate committee; then, it was pilot-tested by a graduate class consisting of agricultural science teachers, vocational supervisors, and teachers from other vocational areas.

A measure of internal consistency (Cronbach's coefficient alpha) was computed to assess the scaling used to quantify and "group" perceptions into the seven scales (Chronbach, Gleser, Nanda, & Rajaratnan, 1972; Heimgarter & Foster, 1981).

Collection of the Data

Data were collected using a questionnaire developed by the researcher. Selected faculty members of the Department of Agricultural Education at Texas A&M University distributed to each teacher as he or she entered the meeting room, a questionnaire, with cover instructions, and a pencil. Jay Eudy, Director of Agricultural Education, Texas Education Agency, explained to the teachers the need for answering the questionnaires, and that this was one opportunity for them to have input into the change process. Completed questionnaires were collected at the conclusion of the meeting as the teachers left the meeting room.

Analysis of the Data

Descriptive statistics (e.g., frequencies, percentages, means, and standard deviations) were used for reporting the characteristics of teachers and of their programs. Teachers responded to statements about their perceptions toward the possible effects of curricular changes on various aspects of their programs. The response scale was a 5-point scale regarding their level of agreement or disagreement with the statements. Then, individual items were grouped into the seven scales. Descriptive statistics (frequencies, percentages, and means) were used to report the perceptions of teachers to these scales.

Pearson product moment correlation coefficients were calculated to measure the relationships between variables measured on interval scales. Then, to compare to the Pearson product moment correlation coefficients, multiple R values were calculated to describe the relationships between those variables measured on nominal scales and those measured on interval scales. Or, if a nominal variable was dichotomous, point biserial correlation coefficients were calculated. Analysis of variance or T-tests were used to determine if differences in perceptions of teachers were related to selected characteristics of teachers or of their programs.

The final portion of the survey instrument consisted of the following two items and response options:

1. If I had **MY** choice to employ the curriculum which is best suited for my program and community, beyond the 1987-88 school year, I would: (a) Continue offering the same curriculum as in the past, (b) Adopt the new curriculum on a limited basis, or (c) Adopt the new curriculum totally.

2. In my agricultural science program during the 1987-88 school year, I plan to: (a) Continue offering the same curriculum as in the past, (b) Adopt the new curriculum on a limited basis, or (c) Adopt the new curriculum totally.

To determine if relationships existed between perceptions, personal choice to change, and actual decision to change, discriminant analysis procedures were employed (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975; Pedhazur, 1982). Finally, Cramer's V was calculated to describe the relationship between personal choice to change/not change and actual decision to change/not change (Hays, 1973).

FINDINGS

Findings Related to Objective 1

Table 1 has been used to report the teacher perceptions, as a group, toward each of the seven scales. This information provides insight into the actual perception of the population surveyed toward effects of the new curriculum on various components of programs of agricultural science.

Table 1
Summary of Perceptions of Teachers
Toward Effects of the New Curriculum on Various
Components of Programs of Agricultural Science

Scale	N	Mean	Standard Deviation
Enrollment	917	3.38	.68
Non-Vocationally Oriented Students	914	3.91	.82
SOEP	903	2.53	.71
Program Administration	906	2.81	.62
Inservice Education	847	3.60	.60
FFA	855	3.18	.70
Change Process	853	3.19	.67

The respondents perceived the effects of the new curriculum to be positive for enrollment, non-vocationally oriented students, and inservice education. They were neutral to slightly positive concerning the effects on the FFA and toward the manner in which the change had been brought about. Teachers expressed negative feelings toward the new curriculum for its effects on SOEP and program administration.

Findings Related to Objective 2

Correlations between personal characteristics of teachers and teacher perceptions toward areas of the agricultural science curriculum that may be affected by the proposed changes are reported in Table 2. Also, the perceptions of the teachers toward the manner in which the change in the curriculum was made have been examined.

Although not all correlations were statistically significant at the .05 level, there were some definite "trends." Some of the major "trends" concerning relationships between teacher characteristics and perceptions were as follows:

1. Experience (age, years of teaching, and tenure at present school) had a statistically significant negative relationship ($p<.05$) with teacher perceptions on the scales concerning enrollment, SOEP, and FFA. As age, years of teaching, and tenure increased, perceptions became more negative toward the proposed changes. However, a positive relationship existed between "tenure variables" and perceptions toward inservice needs resulting from the change.
2. The number of schools in which the teacher had worked was inversely related to all six scales, with significant negative correlations ($p<.05$) existing for number of schools and the scales concerning SOEP, FFA, and the change process. The more schools the teacher had taught at, the more negative were his/her perceptions toward the curricular changes being proposed.

Table 2
Correlation Between Teachers' Personal Characteristics and Perceptions Toward Curriculum Change

(Pearson Correlation Coefficients)

Sub Scales \ Variable	Age	Number of Schools	Years of Teaching	Tenure	Years of Vo Ag	Years in FFA	Sex
Enrollment	-.09**	-.05*	-.10**	-.08*	-.06*	-.06*	.08**
Non Vocational	.03	-.03	.02	-.002	-.03	-.02	-.01
SOEP	-.09**	-.07*	-.12**	-.13**	.01	.02	.05
Program Administration	-.02	-.02	-.05*	-.05*	-.05*	-.04	.05
Inservice Education	.05*	-.04	.05*	.09**	-.05	-.05*	.01
FFA	-.11**	-.08*	-.12**	-.07*	-.04	-.03	.05
Change Process	.02	-.08*	-.01	.03	-.07*	-.05*	.03

* indicates significance at the .05 level
** indicates significance at the .01 level

3. Years spent in vocational agriculture as a student, and years spent as an active member of the FFA were negatively related to teacher perceptions. The more time spent as a student in vocational agriculture and as a member of FFA, the more negative were the perceptions of the teacher.

One-way analysis of variance and post-hoc LSDMOD tests were used to determine if significant differences in perceptions ($p<.05$) existed among teachers of varying levels of education, and among those graduating from different institutions (Nie, et.al., 1975). Each of the variables (education level and institution from which the teacher graduated) were examined in relationship to the scales that had been developed.

The relationships between level of education and the seven scales which measured teachers' perceptions of the effects of change were inconclusive. That is, there was little evidence to suggest that the educational level of teachers was a major influencing factor in how teachers perceived the changes in curriculum. Similarly, there was little evidence that the institution from which their last degree was granted influenced teachers' perceptions toward the changes.

Findings Related to Objective 3

Decisions Concerning Adoption of the Proposed Curricular Changes

Teachers were asked to respond to two questions concerning their ultimate adoption or rejection of the new curriculum. The first question concerned what they would do, given their choice concerning adoption of the new curriculum. Table 3 contains a summary of responses to this question.

Table 3
Crosstabulation of Questions
Concerning "Free Choice" and "Actual Decision"

	Free Choice			
Actual Decision	1	2	3	Row Total
1) Keep present curriculum	**100**	155	65	320 (40.8%)
2) Adopt new curriculum partially	26	**249**	89	364 (46.4%)
3) Adopt new curriculum completely	2	11	**87**	100 (12.8%)
Column Total	128 (16.3%)	415 (52.9%)	241 (30.7%)	784 (100.0%)
Cramer's V statistic = .40**				

** Indicates significance at the .01 level.

Of the teachers who responded to this question (N=784), 83.6 percent stated that, given the choice, they would make some changes in their current programs. These changes would come about by either a partial or complete adoption of the new curriculum being proposed for Texas. Only 16.3 percent said that they would choose to remain with the same curriculum, if given a choice. This would seem to indicate that teachers in Texas do in fact recognize the need for change in their current programs. Comments by those stating that they would make changes usually cited declining enrollment and out-of-date program emphasis as the major reasons why they would accept the new curriculum. Those who stated that they would remain the same felt that the program was fine as was and served the needs of their community and students. An "if it ain't broke, don't fix it" attitude prevailed in the comments concerning their choice not to adopt the new curriculum.

The second question concerned what the teachers would actually be doing concerning curriculum for the 1987-88 school year. A summary of responses for that question is also contained in Table 3. Of the teachers responding to this question, over one-half (n= 464, 59.2%) of the teachers indicated that they would adopt the new curriculum in part or completely for the 1987-88 school year. Many of the teachers who indicated in question one that they would prefer to change, but were remaining the same for the 1987-88 school year, did so because of the following reasons: (a) lack of information that new curriculum could be adopted, (b) schedules were already set for upcoming year, or (c) new curriculum had not been approved officially by the State Board of Education. Those teachers in question one who said that they would not change if given their choice, but who indicated in this question that they were indeed making changes for the 1987-88 school year, cited pressure from their administration to change as the primary reason.

Relationships Between Perceptions and Choice to Adopt or Reject Changes

Discriminant analysis was used to determine the relationships between perceptions and the respondents' "free choice" concerning the new curriculum and between perceptions and their actual decisions about the new curriculum for the 1987-88 school year. Table 4 contains information regarding the relationships between perceptions of teachers and the respondents' "free choice" to adopt or reject the new curriculum.

Table 4
Relationships Between Perceptions of
Teachers and Their "Free Choice" Concerning Curriculum

	Scale			F Ratio	F Prob.
Choice	N	Mean	S.D.	Multiple R	
Effect on Enrollment					
Keep present curriculum	130	2.78	0.79	98.1	<.01
Adopt new curriculum partially	403	3.37	0.59	R = .53	
Adopt new curriculum totally	227	3.73	0.54		
Effect on Non-Vocational Students					
Keep present curriculum	130	4.00	0.99	2.5	.08
Adopt new curriculum partially	403	3.94	0.80	R = .10	
Adopt new curriculum totally	227	3.81	0.81		
Effect on SOEP					
Keep present curriculum	130	2.20	0.74	41.5	<.01
Adopt new curriculum partially	403	2.46	0.67	R = .38	
Adopt new curriculum totally	227	2.85	0.69		
Effect on Program Administration					
Keep present curriculum	130	2.45	0.67	56.9	<.01
Adopt new curriculum partially	403	2.75	0.54	R = .43	
Adopt new curriculum totally	227	3.11	0.61		
Effect on Inservice Education					
Keep present curriculum	130	3.49	0.75	3.1	.05
Adopt new curriculum partially	403	3.63	0.52	R = .11	
Adopt new curriculum totally	227	3.62	0.61		
Effect on FFA					
Keep present curriculum	130	2.62	0.77	82.5	<.01
Adopt new curriculum partially	403	3.16	0.61	R = .50	
Adopt new curriculum totally	227	3.53	0.60		
Perceptions Toward Change Process					
Keep present curriculum	130	2.58	0.71	134.6	<.01
Adopt new curriculum partially	403	3.14	0.57	R = .59	
Adopt new curriculum totally	227	3.61	0.51		

The perceptions of individuals toward the "change process" was the best predictor of their choice to keep the same curriculum, adopt the new curriculum partially, or adopt the new curriculum completely (R=.59). Other perceptions that were highly predictive of respondents' choice were: effect on enrollment (R=.53), effect on FFA (R=.50), effect on program administration (R=.43), and effect on SOEP (R=.38).

The second question concerned what respondents were actually going to do concerning the new curriculum for the 1987-88 school year. Relationships between perceptions regarding the new curriculum and teachers' actual decisions concerning the curriculum to be employed during the 1987-88 school year were examined. Table 5 contains this information.

Table 5
Relationships Between Perceptions of Teachers and
Their "Actual Decision" Concerning Curriculum for 1987-88

	Scale					
Choice	N	Mean	S.D.	F Ratio	F Prob.	Multiple R
	Effect on Enrollment					
Keep present curriculum	297	3.22	0.75	26.0	<.01	
Adopt new curriculum partially	349	3.42	0.63			R = .31
Adopt new curriculum totally	95	3.78	0.55			
	Effect on Non-Vocational Students					
Keep present curriculum	297	4.04	0.84	5.7	<.01	
Adopt new curriculum partially	349	3.82	0.81			R = .15
Adopt new curriculum totally	95	3.92	0.87			
	Effect on SOEP					
Keep present curriculum	297	2.38	0.71	11.6	<.01	
Adopt new curriculum partially	349	2.59	0.69			R = .21
Adopt new curriculum totally	95	2.73	0.77			
	Effect on Program Administration					
Keep present curriculum	297	2.69	0.65	16.1	<.01	
Adopt new curriculum partially	349	2.82	0.57			R = .25
Adopt new curriculum totally	95	3.09	0.68			
	Effect on Inservice Education					
Keep present curriculum	297	3.61	0.66	0.7	.51	
Adopt new curriculum partially	349	3.62	0.54			R = .05
Adopt new curriculum totally	95	3.54	0.61			
	Effect on FFA					
Keep present curriculum	297	3.04	0.74	13.3	<.01	
Adopt new curriculum partially	349	3.21	0.67			R = .23
Adopt new curriculum totally	95	3.45	0.66			
	Perceptions Toward Change Process					
Keep present curriculum	297	2.98	0.70	31.3	<.01	
Adopt new curriculum partially	349	3.26	0.61			R = .34
Adopt new curriculum totally	95	3.54	0.60			

As was the case with the question concerning "free choice," the best indicator of what the teacher was actually going to do for the 1987-88 school year came from their perceptions of the "change process" (R=.34). Other perceptions which were predictive of the actual decision to remain with the present curriculum, adopt the new curriculum partially, or adopt the new curriculum completely for the 1987-88 school year were those concerning the following: enrollment (R=.31), program administration (R=.25), FFA (R=.23), SOEP (R=.21), and non-vocationally oriented students (R=.15).

Many teachers stated that even though they favored the new curriculum, they were remaining with the present one until official approval of the changes had been made by the State Board of Education. Others cited scheduling problems and lack of information and teaching materials as reasons why they were postponing adoption of the new curriculum. On the other hand, many teachers who perceived the new curriculum negatively stated that administrators were forcing them to change even though they preferred the present curriculum.

CONCLUSIONS

Following are the conclusions of this study; each conclusion is followed by the major findings which supported it.

1. The experience of the teacher was negatively related to teachers' perceptions of the effects of the new curriculum on enrollment, SOEP, and FFA. The findings which support this conclusion were that age, years of teaching, and tenure at present school had statistically significant negative relationships with teachers' perceptions toward effects on enrollment, SOEP, and FFA.
2. The number of schools in which the teacher had worked was negatively related to teachers' perceptions toward all aspects of the curricular change. Statistically significant negative relationships existed for teacher perceptions of effect on SOEP, FFA, and toward the change process. Moreover, as the number of schools in which the teacher had taught increased, the perceptions became more negative for all areas concerning the curricular changes.
3. A background as a student in vocational agriculture or as a member of the FFA was negatively related to teachers' perceptions toward the new curriculum. As the number of years that teachers had spent in vocational agriculture or as a member of the FFA increased, perceptions of the effects of the new curriculum became more negative for all scales.
4. The size of the school in which the teachers taught, size of community in which the school was located, the number of students in the program, and number of females in the program were related factors to teachers' perceptions. As each of these variables increased, the more positive were the perceptions of teachers concerning the effect of the new curriculum on all aspects of the programs.
5. Teacher's perceptions toward the "change process" (need for the change, manner in which the change was managed, amount of teacher input into the change, etc.) was the single best predictor of the teacher's "free choice" and "actual decision" concerning adoption of the change.
6. "Free choice" and "actual choice" were related; however, only a relatively small portion (16.3%) of the variance in "actual decision" was explained by "free choice" decision. In other words, factors other than the teachers' own decision were more important than were the teachers' choices in determining 1987-88 curriculum in agricultural science.

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PERCEPTIONS OF SECONDARY AGRICULTURAL SCIENCE TEACHERS TOWARD PROPOSED CHANGES IN AGRICULTURAL CURRICULA IN TEXAS

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Since change is taking place across the country, and teacher attitude toward change is critical if the changes are to be properly implemented, this is a timely study.

The 65% return rate of the questionnaires may be important as non-respondents may be different. The importance of anonimity probably made it necessary to pass out the questionnaires at the state conference, and I am not sure how to improve it.

Cronbach's alpha was mentioned but not reported in the paper.

Discriminant analysis was reported to have been used, but none of the traditional discriminent analysis statistics were reported.

Table 3 was difficult to understand. Actual category headings should have been used.

Persons involved in a successful program may resist change because things are going well and most people are happy.

The importance of the people who need to make change being involved in the planning/decision making process may well have something to say about the work of the National Council if state and local people feel left out of the planning/decision making process.

PERCEIVED IMPACT OF EDUCATIONAL REFORMS ON HIGH SCHOOL AGRICULTURE PROGRAMS

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INTRODUCTION

Since 1983, various widely publicized national reports on education have advocated a renewed emphasis on basic skills and academic excellence. Both the basic skills movement and the academic excellence movement emphasize various educational reforms. The proposed reforms appear to be having an impact on all areas of education.

Several states have passed legislation designed to reform their educational programs. In 1984, the Tennessee Legislature passed a reform package known as the "Better Schools Program." The heart of this program was a career ladder plan for teachers, basic skills pupil testing, and computer training before high school.

Reforms, while possibly good in themselves, may have a positive impact on some instructional programs and a negative impact on others. The authors could find very little data on the impact of educational reforms on vocational agriculture programs.

PURPOSE AND OBJECTIVES

This study was designed to determine the perceived impact of educational reforms on high school agriculture programs in Tennessee as viewed by high school principals and their vocational agriculture teachers. Specific objectives were as follows:

1. Identify educational reforms that have had a positive impact on local programs of vocational agriculture.
2. Identify educational reforms that have had a negative impact on local programs of vocational agriculture.
3. Determine the impact educational reforms have had on selected variables related to local programs of vocational agriculture.
4. Identify improvements in vocational agriculture that have resulted from implementation of educational reforms.

5. Determine if there are significant differences between high school principals and vocational agriculture instructors in their perceived impact of educational reforms on vocational agriculture programs.

PROCEDURES

The population consisted of all Tennessee high school vocational agriculture teachers and their principals. A demographic data questionnaire and a survey instrument were developed by the researchers and refined by the Tennessee Joint Staff for Agricultural Education. Data collection procedures were by mailed questionnaire and by administering the survey to teachers attending the State FFA Convention. A response rate of approximately 65 percent was obtained.

ANALYSIS OF DATA

Responses to the survey questionnaire were analyzed using descriptive statistics, factor analysis, and multivariate analysis of variance.

RESULTS

The high school principals and agriculture teachers participating in the study were asked to rate the impact of 33 educational reforms on their local programs of vocational agriculture using a four-point Likert-type scale as follows: 1 = strong negative impact; 2 = negative impact; 3 = positive impact; and 4 = very positive impact. A mean rating was calculated for each reform.

Mean ratings of 2.49 or less were considered to have a negative impact, and mean ratings of 2.50 or greater were considered to have a positive impact.

Educational reforms receiving a mean rating of 2.25 or less are as follows:

Item	Mean
1. College preparatory curriculum recommended by the U. T. Board of Trustees and the State Board of Regents.	1.66
2. Offering more required courses and fewer elective courses.	1.70
3. Increase in the administration and non-instructional burdens on teachers.	1.92
4. Increase in the number of units or credits required for graduation.	1.93
5. Career ladder as a means of terminating incompetent teachers.	2.09
6. Career ladder as a means of reducing teacher turnover (number of teachers leaving the profession).	2.17

7.	Career ladder as a means of recognizing and rewarding excellent teachers.	2.22
8.	Increase in time devoted to the basic academic subjects.	2.22

Educational reforms receiving a mean rating of 2.75 or greater are as follows:

	Item	Mean
1.	Increase in teacher input into programs, tests, and materials used in the school/classroom.	3.21
2.	Involving business, labor, and civic leaders in educational planning.	3.17
3.	Implementation of attendance policies to reduce absenteeism and tardiness.	3.16
4.	Implementation of alternative programs to meet the needs of continually disruptive students.	3.07
5.	Reduction in the layers of administrative bureaucracy in public school systems.	3.07
6.	More instruction in effective study and work skills.	3.07
7.	Mandated curriculum guides for all subject areas.	3.20
8.	Counseling to improve self-esteem and achievement of students.	3.01
9.	Establishment of individualized learning centers for failing students.	2.99
10.	Objective grading scales based on measurable standards.	2.89
11.	Reorganization of school/classroom to expand instructional time.	2.89
12.	State Proficiency Test required for high school graduation.	2.83
13.	Increase in minimum college grade-point average for teacher certification.	2.76

A factor analysis of responses to the 33 educational reforms yielded seven factors. A multivariate analysis of variance was calculated to determine significant differences in factor mean responses between principals and vocational agriculture teachers for each of the seven factors. A significantly higher mean response rating was observed for principals than for vocational agriculture instructors for each of the six factors yielding significant differences. These factors are as follows:

1. Career ladder program for teacher certification, recertification, and evaluation (F = 3.54; P = .004).
2. Increase in high school graduation requirements with emphasis on a college preparatory curriculum (F = 3.68; P = .001).
3. More stringent curriculum development requirements to include study and work skills, teacher input and attendance policies (F = 5.13; P = <.000).
4. Expand and reorganize school and classroom instructional time (F = 4.33; P = .002).
5. Meet the individualized needs of special students and establish objective evaluation procedures (F = 5.88; P = <.000).
6. Increase in academic requirements for certification and non-instructional burdens on teachers (F = 3.88; P = .005).

The high school principals and vocational agriculture teachers participating in the study were asked to indicate the impact educational reforms have had on selected variables related to local programs of vocational agriculture by rating 14 items on the same Likert-type scale.

Seven of the items received a mean rating of 2.50 or greater, and seven received a mean rating of 2.49 or less.

Items receiving a mean rating of 2.00 or less are as follows:

Item	Mean
1. Funds available for professional travel.	1.81
2. Quality of vo-ag students joining the FFA.	1.84
3. Number of vo-ag students joining the Future Farmers of America (FFA).	1.91
4. Number of vo-ag students with supervised occupational experience programs (SOEP's).	1.97
5. Number of agriculture classes offered to older and young out-of-school adults.	1.98

One item received a mean rating of 3.00 or greater as follows: Opportunities for extended (summer) employment (mean = 3.12).

A factor analysis of responses to these 14 items yielded two factors. A multivariate analysis of variance was calculated to determine significant differences between the responses of principals and vocational agriculture teachers for each factor. A significantly higher mean response rating was observed for principals than for vocational agriculture instructors for the following factor: Quality of vocational agriculture students and their involvement in FFA and supervised occupational experience program activities ($F = 2.32$; $P = .027$).

The participants of the study were asked to indicate the improvement in local vocational agriculture programs they are experiencing as a result of state and national reforms proposed or implemented to improve vocational agriculture programs. A five-point Likert-type scale ranging from 1 = no improvement, to 5 = great improvement, was used to rate the 12 items.

All 12 items received a mean rating of 3.03 or greater. The items receiving a mean rating of 3.5 or higher are as follows:

Item	Mean
1. Seek approval of science credit for agriculture courses.	3.68
2. Utilization of state curriculum guide to improve instruction.	3.57
3. Enhance the image of vocational agriculture to combat negative impressions of the farm crisis.	3.55
4. Assist counselors and administrators in their understanding of opportunities in agriculture.	3.55
5. Implement active FFA alumni affiliate to support programs.	3.52

A factor analysis of responses to these 12 items yielded three factors. A multivariate analysis of variance yielded no significant differences in mean ratings between principals and vocational agriculture instructors.

CONCLUSIONS AND/OR RECOMMENDATIONS

Based on the findings, the following conclusions and recommendations were made.

1. The principals and vocational agriculture teachers believed that 19 of the educational reforms had positively affected vocational agriculture programs. Teachers, principals, and other educational leaders should continue to seek ways to implement educational reforms that will enhance the quality of high school vocational agriculture programs.

2. The principals and vocational agriculture teachers believed that 14 of the educational reforms had negatively affected vocational agriculture programs. Several of these reforms relate to the

increase in graduation requirements and increased emphasis on the college preparatory curriculum. Vocational agriculture teachers and their administrators should seek alternative curricular offerings and flexible scheduling of vocational agriculture courses to enable students to complete agriculture courses and the college preparatory curriculum.

3. In general, vocational agriculture teachers perceived that educational reforms were having a more negative impact on vocational agriculture programs than did their principals. Program and curriculum articulation among vocational agriculture teachers, advisory councils, administrators, and business, labor, and civic leaders should be enhance.

4. Participants believed that educational reforms were having a negative impact on the quality and quantity of FFA membership, student participation in SOE programs, and participation in adult education. Vocational agriculture teachers should seek changes in the FFA and SOE programs to meet the needs of students enrolled in semesterized and non-traditional agriculture courses.

5. Participants believed that approval of science credit for agriculture courses would improve local vocational agriculture programs. The image of vocational agriculture may be enhanced by organizing and implementing agricultural science courses with flexibility in course selection. Scheduling seven-period days may also allow more flexibility of entry and exit, thereby attracting high quality, academically talented students that can benefit from having completed agriculture courses.

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Perceived Impact of Educational Reforms on High School Agriculture Programs
A Critique

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Indeed educational reforms have the attention of the profession as state staffs work through the policy and programmatic changes given to them through legislation and implementation of study recommendations. The authors have initiated an area of study which needs to occur in every state. The profession must be careful in how it monitors change because our "expert" opinions are respected and will play an important role in the formative and summative evaluations of our programs.

The authors indicated that there was a lack of information about the impact of educational reforms. That is understandable considering that many of the reforms are in the process of being implemented. However, a research base does exist that includes program quality factors, perceptions of the quality of program components, and validated standards for agricultural education. If one is going to study how reforms impact on programs, it is logical that some theoretical base should be developed that includes perceived program strengths and weaknesses. This paper lacks a theoretical framework and an adequate review of literature. The authors listed eight references at the end of their paper. It would strengthen the paper to cite the findings or opinions from these references in the introduction as they apply to this study.

The purpose and objectives of the study were clearly written. The population for the study included all Tennessee high school vocational agriculture teachers and their principles. Since a demographic questionnaire was designed by the researchers, it would be interesting to the reader to know something about the characteristics of the study participants. To control for frame error, the researchers needed to indicate how they identified the members of the target population. Was a state directory used ? The number of cases in the study population needs to be specified. Obtaining a response rate of 65% is very good, but the reader is left wondering as to how many teachers and principals responded. The N was never reported in the paper.

It is not clear from the paper as to how non-response error was controlled. Apparently, non-respondents were ignored. Data were collected by mail questionnaire and at the State FFA Convention. Were 100% of the teachers at the convention ? Were questionnaires mailed to the absent teachers ? If not, those present had a greater chance of being included in the study and selection error has occurred. The data collection procedures needed further clarification.

The researchers controlled for some of the measurement error by establishing the content validity of their instrument. Reliability estimates, however, are not noted. The internal consistency could be determined by computing the Kudar-Richardson 21 or Cronbach's alpha. A field test of the instrument might also prove to be useful as this is a relatively unique study.

This is a descriptive study of a population. The impact of the educational reforms were appropriately described as the researchers reported mean scores. A standard deviation should also be reported along with a more in depth description of the findings. The use of inferential statistics is not appropriate. To whom do the researchers wish to infer ?

The conclusions and recommendations were clearly stated and related to the study objectives. While a number of methodological concerns have surfaced in this discussion, the researchers have revealed several important trends in their state with respect to teachers' and principals' opinions of educational reforms. The researchers know that there are positive attitudes toward 19 of the reforms and negative attitudes toward 14 reforms. Careful implementation of the reforms must occur in view of the practitioners' opinions. Hopefully, the authors will treat the findings of this study as a first and not as as a final analysis of how educational reform is impacting their programs.

Predictors of Professional Participation by Vocational Agriculture Teachers

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INTRODUCTION

While much is said about the benefits to be derived by educators from membership in professional organizations, membership in such organizations has fallen far short of the potential number. For example, in the American Vocational Association (AVA) membership decreased by 4,186 to 40,514 in 1987 according to the AVA Assemby of Delegates list for the 1987 AVA Convention. Buzzell (1987) estimated there were more than 250,000 vocational educators (potential members) in 1986 in the United States. The National Vocational Agricultural Teachers Association (NVATA) experienced similar trends with 7,787 members out of a possible 12,782 members in 1987 (S. Stenzel, personal communication, August 17, 1987).

A review of the literature revealed three catagories of factors related to membership in professional organizations. The first catagory, degree of professionalism, suggests that membership in a professional organization is a manifestation of degree of professionalism (Howsam, Corrigan, Denemark, & Nash, 1976; Hutchinson, 1976; Pisapia, 1976; Nagi, 1973; Evans, 1972; Simpson, 1969; Hall, 1968; & Wilensky, 1964). The second catagory, self-percieved importance of organization role and member benefits, implied that membership can be dependent upon perceptions concerning the importance of the professional organization (McHam, 1984; Gysbers, & Dyrenfurth, 1983; Robison, 1979; Leroy, 1977; Stenzel, 1976; & Weber, 1972). The last catagory, teacher characteristics, suggested that certain demographic characteristics are correlated to membership in professional organizations (Evangelauf, 1987; The Task Force on Teaching as a Profession, 1986; Sizer, 1984; Tombs and Sams, 1977; Aven, 1973; Nagi, 1973; & Simpson, 1969). No literature was found that addressed how these three catagories in combination might be related to membership in professional organizations.

PURPOSE AND OBJECTIVE

The primary purpose of this study was to determine predictors of membership of vocational agriculture teachers in professional organizations for vocational agriculture teachers. More specifically, the objective was to:

1) identify a set of best predictors of membership from degree of professionalism, self-perceived importance of organizational role and member benefits, and teacher characteristics.

PROCEDURES

The population for this study was all vocational agriculture teachers listed in the 1987 Agriculture Teachers Directory. According to S. Henry (personal communication, September 14, 1987), editor of the Directory, there were approximately 12,782 such individuals in the United States.

According to Kerlinger (1986) and Roscoe (1975), samples for multivariate research should be ten times as large as the number of independent variables. Given this requirement, it was determined that an accepting sample of 300 was needed for analysis. Dillman (1983) reported an average response rate of 73% when the Total Design Method (TDM) (Dillman, 1978) was employed. Also, it was determined by contacting knowledgeable persons in five states that an additional nine percent adjustment was necessary to reduce frame error for those who were no longer teaching in the position as listed in the Directory. Given these adjustments, 447 subjects were randomly selected by systematic sampling as described by Ary, Jacobs, and Razavieh (1985).

To control for non-response error, a 20 subject non-respondent sample was randomly selected and studied to determine if the non-respondents were different from those who returned the questionnaire. The non-respondent survey was conducted via telephone. No differences were found.

To maximize response rate, the instrumentation was designed and implemented with TDM procedures. The first part of the questionnaire measured the self-perceived importance of roles and member benefits of the professional organizations for vocational agriculture teachers with a Likert-type scale. Respondents were asked to indicate the degree to which they agreed or disagreed with the importance of the various statements (1 = completely disagree, 6 = completely agree). This portion was adapted from a study conducted by Robison (1979) with a reported alpha coefficient of 0.908. Responses to this portion were analyzed with factor analysis which resulted in collapsing the items to four factors. The four factors were: (1) Importance of program improvement activities; (2) Importance of member services; (3) Importance of professional development activities; and (4) Importance of policy development activities.

The second part of the questionnaire consisted of a modified version of Hall's Professionalism Scale (Snizek, 1972). Depending on the data set, Kuder-Richardson Formula 20 reliability coeffecients of 0.783 to 0.843 were reported. This Likert-type scale was intended to measure the five attitudinal components or dimensions of professionalism as identified by Hall (1968). The accepting sample indicated the degree to which the statements represented their attitudes and behaviors regarding professionalism (1 = very poorly, 5 = very well). The attitudinal components of professionalism are: (1) Use of the professional organization as a major referent; (2) Belief in public service; (3) Belief in self regulation; (4) Sense of calling to the field; and (5) Sense of autonomy.

The third part of the questionnaire was designed to collect demographic data that were used as possible predictors. Both nominal and interval data were collected by the third portion of the questionnaire. Nominal data included production agriculture background, mode of teacher certification, membership status in professional organizations as a student, gender, future career plans, membership status in various general education associations, past enrollment in secondary vocational agriculture, and the type of program in which currently employed. Nominal data were dummy coded for analysis purposes. Interval data included level of education, age, years of teaching experience, years of FFA membership, and salary. Interval data were collected by use of items with pre-established ranges and coded accordingly.

ANALYSIS OF DATA

The specific statistical technique used was discriminant analysis. Discriminant analysis is similar to multiple regression except that the criterion variable is the person's group membership (Borg & Gall, 1983). The discriminant analysis equation uses a persons's scores on predictor variables in an attempt to predict the group of which the person is a member. The criterion variable was membership or non-membership in professional organizations for vocational agriculture teachers. The predictor variables were the sub-scores on the professionalism scale, the factor sub-score on the self-perceived importance of organizational role and member benefit scale, and the selected teacher characteristics.

Of the 316 (70.7%) returned questionnaires, 186 were returned by agriculture teachers who were either members of no professional organizations for agriculture teachers or members of four professional organizations (American Vocational Association, a state affiliate of the American Vocational Association, National Vocational Agriculture Teachers Association, and a state affiliate of the National Vocational Agriculture Teachers Association). These 186 respondents were included in the analysis. The remaining 130 respondents were members of from one to three professional organizations.

FINDINGS

In discriminant analysis, the canonical correlation coefficient is a measure of association which summarizes the degree of relatedness between the groups and the discriminant function (Klecka, 1980). A value of zero denotes no relationship at all, while 1.00 represents a maximum degree of association. Table 1 shows a canonical correlation of .712.

The statistic used to measure discrimination is Wilks' lambda or the U statistic, a multivariate measure of group differences (Klecka, 1982, p. 38). A lambda close to 1.00 indicates very little discrimination while a value near zero indicate high discrimination. Table 1 shows that a Wilks' lambda of .493, indicating statistically significant discrimination, was computed for this analysis ($X^2 = 80.88$, $p \leq .05$, df = 17).

Table 1

Discriminant Function Summary

Function	Canonical Correlation	:	After Function	Wilks' Lambda	df	Chi Square
		:	0	.493	17	80.88*
1	.712	:				

*$p \leq .05$, X^2crit = 27.59

The percentage of cases correctly classified in discriminant analysis is analogous to the concept of R-squared in regression analysis (Hair, Anderson, Tatham, & Grablowsky, 1984) and is subject to a similar interpretation. As seen in Table 2, the discriminating variables correctly classified 82.3% of the respondents.

Table 2

Classification Results for Discriminant Analysis

Actual Group	Number of Cases	Predicted Group Membership All	 None
Member of All	131	109 83.2%	22 16.8%
Member of None	55	10 18.2%	45 81.8%

Note. Percent of "Grouped" cases correctly classified = 82.30%

In order to evaluate the predictive accuracy of the discriminant function, it must be compared to the percentage of cases that could be correctly classified by chance, that is, without the aid of the discriminant function. Hair et al. (1984) suggests the use of a t-test as presented in Table 3. As can be seen in the table, the classification accuracy is significantly different than proportional chance classification.

Table 3

Predictive Accuracy of Discriminant Analysis

	Proportional Chance		Classification Accuracy		
Analysis	n	%	n	%	t
All vs. None	186	58.4	186	82.3	6.64*

*$p \leq .05$, $t_{crit} = 1.96$

Discriminant functions are interpreted for the purpose of determining the relative importance of each of the discriminating variables in classifying the cases into the outcome groups. As seen in Table 4, 17 discriminating variables were identified when those who were members of no professional organizations were compared to those who were members of four professional organizations. The five most important were: previous student membership in professional organizations, membership status in the American Federation of Teachers, perceived importance of member services, use of the professional organization as a major reference, and years of membership in the Future Farmers of America.

Table 4

Summary Means for Discriminating Variables in Order of Importance

Variable[a]	Group Means					
	All	None	*df*	*F*	Wilks' Lambda	Wilks' Lambda Increment
1	.780	.320	(1,123)	23.033*	.842	.158
2	.010	.120	(2,122)	17.729*	.775	.067
3	4.078	4.728	(3,121)	15.035*	.728	.047
4	3.816	3.344	(4,120)	13.325*	.692	.036
5	4.630	4.120	(5,119)	11.900*	.667	.025
6	5.234	5.286	(6,118)	10.736*	.647	.020
7	3.662	3.320	(7,117)	9.432*	.606	.041
8	.640	.360	(8,116)	8.942*	.588	.018
9	2.800	3.240	(9,115)	8.683*	.569	.019
10	3.900	3.560	(10,114)	8.625*	.542	.027
11	3.644	3.552	(11,113)	8.233*	.531	.011
12	.270	.440	(12,112)	7.732*	.525	.006
13	.260	.080	(13,111)	7.392*	.518	.007
14	.110	.120	(14,110)	7.314*	.515	.003
15	.870	.680	(15,109)	7.042*	.508	.007
16	.180	.240	(16,108)	6.725*	.501	.007
17	4.370	4.200	(17,107)	6.462*	.493	.008

*$p \leq .05$

[a]1 student member of professional organization
2 membership in the American Federation of Teachers
3 perceived importance of member services
4 use of the professional organization as a major reference
5 years of membership in the FFA
6 perceived importance of program improvement activities
7 belief in self regulation
8 membership in the National Education Association
9 years of teaching experience
10 salary
11 sense of calling to the field
12 non-membership in general education associations
13 membership in a local education association
14 location of program in area vocational technical schools
15 production agriculture background
16 future plans outside of education
17 level of education

Note. variables 1, 2, 5, 8, 12, 13, 14, 15, and 16 were dummy coded

RECOMMENDATIONS

Student membership in professional organizations appeared in the discriminant analysis as the most important predictor of membership. Although cause-and-effect is not proven in discriminant analysis, the findings of discriminant analysis are often used in such manner. An approach for future research would be to manipulate student membership (i.e. obtain more student members) to determine if student membership makes a difference.

Teacher educators possibly have the opportunity to increase student membership. Those who make decisions concerning teacher education programs may wish to include more in their curriculum on becoming a professional. The affective attitudes of professionalism, such as the use of the professional organization as a major referent, could be addressed in course objectives.

Recommended action to be taken as a result of this study also includes the identification of potential members/non-members. Using the predictors of membership, as identified by the discriminant analysis, those teachers who are "at risk" of becoming non-members can be identified for recruitment or education efforts concerning the benefits of membership. Development of a profile of the "at risk" teacher would aid in this effort. Such a profile would include at the five most important predictors of membership.

Also recommended are areas for further research. Would the findings be different for teachers in other vocational education programs? Are vocational agriculture teachers and academic teachers different in professionalism and self-perceived importance of organization role and member benefits? Is it possible to identify other predictors which might enhance the predictive accuracy of the discriminant analysis? If increased efforts are made to recruit or retain "at risk" teachers, will those efforts be successful?

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PREDICTORS OF PROFESSIONAL PARTICIPATION BY VOCATIONAL AGRICULTURE TEACHERS

A Critique

Dennis C. Scanlon, The Pennsylvania State University--Discussant

I would like to begin by complimenting the researchers for choosing an appropriate topic worthy of investigation. The whole question of why people do or do not join an organization is prerequisite to identifying effective recruitment techniques.

The study is well founded in social psychology, i.e., the researchers have established a firm conceptual base for their study. The population and sample are well defined and the researchers have taken appropriate measures to control for frame and non-response error. Instrumentation is exceptionally well described and the discriminant analysis statistical technique was appropriate.

If we approach research from a practical point of view I might ask, "If I had to increase membership in professional organizations based on this study, what does this study say to me?" The data show that student membership in professional organizations is the most significant variable in the discriminant equation, explaining 16% of the variance. The remaining four variables, identified as important by; the researcher, explained an additional 19% of the variance.

What rationale did you have for stopping at the first five variables? The F values show significance for all 17 variables ... could the F values indicating statistical significance be due to the size of the sample ... but have little practical significance? The remaining 12 variables explained an additional 14% of the variance with a total explained variance of 49% as indicated by the Wilks Lambda. The discriminant function correctly categorized 82% of the cases, and that is good work.

However, I would suggest that if the researchers had spent less time describing their statistical techniques and more time drawing conclusions and implications about the findings, then we would have a better piece of work.

Have we just confirmed what other researchers have found or have we added to the knowledge base in the area of professional organizations? Can we assume that vocational educators are like math and English teachers and do or do not join for the same reasons?

Do high school agriculture students refuse to join FFA for the same reasons that teachers refuse to join professional organizations?

Are there characteristics of different organizations, i.e., recreational groups vs. professional groups that influence people to become members?

And finally, how do the researchers suggest we manipulate student membership?

You either add to, substantiate or disprove the conceptual base of knowledge surrounding a particular issue ... to do neither becomes an exercise in applying research and statistical techniques.

This study addresses a very real problem in the profession ... but it raises more questions than it answers. It is interesting to this reader because of what it doesn't say and because of the strong feeling it generates in the direction of further inquiry.

PREPAREDNESS FOR TEACHING VOCATIONAL AGRICULTURE: PERCEPTIONS OF FIRST YEAR TEACHERS

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INTRODUCTION

According to Hylton (1979), "Teacher effectiveness is the degree to which a teacher performs selected competencies deemed necessary for the conduction of effective programs of vocational education in agriculture/agribusiness" (p. 6). Warmbrod (1978) notes that high quality programs require, "first and foremost, a corps of competent teachers: that is, teachers who are experts in the technology and skills in the specialized areas of agriculture and related sciences; teachers who have the ability to apply and relate that knowledge and skill to the world of work generally and to occupations specifically; and teachers who have a high degree of professional expertise and skill in planning, teaching and evaluating educational programs (p. 269).

An examination of the literature related to competencies needed by vocational agriculture teachers revealed numerous sources (Shippy, 1981; Hylton, 1979; Everett, 1977; Rawls & Fatunsin, 1985; and Saladaga, 1981) documenting similar necessary competencies. Saladaga (1981) surveyed Louisiana vocational agriculture teachers to determine perceived level of need and level of attainment of competencies and reported that very few competencies had a mean rating at the highest level of attainment. Yet, more than half of the competencies had mean ratings indicating an essential or moderate level of need. Teachers perceived themselves as moderately competent according to Saladaga.

Others have studied preparedness of vocational agriculture teachers. King and Miller (1985) found that Georgia vocational agriculture teachers had the greatest difficulties with competencies in the areas of young and/or adult farmers and the least difficulty with competencies in the area of classroom and laboratory instruction. Bowen (1986) expressed concern that teachers lack knowledge of technical agriculture because of rapidly changing technology. Bowen maintained that frustration results when teachers try to teach a subject without having received prior preparation. "Few things can match the satisfaction that comes to a teacher who has the rare blend of enthusiasm, presentation skills, and subject matter competence needed to direct the learning process" (Bowen, 1986, p. 3).

What factors contribute to the preparation and development of quality teachers? This question has been discussed and examined by a number of teacher educators and researchers. Byler and Byler, (1984); Cruickshank and Armaline, (1986); and Morrow and Lane, (1983) all contend that student teaching is the most crucial component of teacher development. Others (Van Patten, 1977 and Huling & Hall, 1982) believe that the quality of preservice courses in the teacher education undergraduate program is the most important. Still others (Saladaga,

1981) suggest that teachers learn much of what is required through on-the-job or self study.

After thoroughly examining the literature concerning teacher preparedness answers to two questions remain inconclusive. Are teachers of vocational agriculture adequately prepared for their job responsibilities? And, what sources of preparation contribute the most to overall preparedness for teaching? These two important questions formed the basis for the study.

OBJECTIVES

The purpose of this study was to determine the preparedness of first year teachers for teaching vocational agriculture. The objectives of the study were as follows:

1. To determine first year teachers' self-perceived preparedness for teaching vocational agriculture.

2. To identify sources of the self-perceived preparedness of first year teachers.

3. To identify significant sources of variance in perceived preparedness explained by components of the preservice program and characteristics of first year teachers.

PROCEDURES

Results reported in this paper are one component of a larger study which also assessed satisfaction with student teaching. Three target populations, first year teachers, cooperating classroom teachers and university supervisors who were directly involved with agricultural education student teaching programs in the AATEA Southern Region of the United States during the fall of 1984 and spring of 1985 were part of the larger study. The population from which data was collected for this report consisted of all first year teachers employed during the 1985-86 school year in the AATEA Southern Region who student taught during the fall of 1984 or spring of 1985. Contact with directors of student teaching at each institution preparing vocational agriculture teachers identified 117 graduates who were teaching during the 1985-86 school year.

A first year teacher questionnaire was developed, validated, and pilot tested to assess completeness and determine reliability. In the initial development of the instrument, a list of competencies that beginning teachers should be prepared to accomplish was developed by examining studies conducted by Hylton (1979), Everett (1977) Rawls and Fatunsin (1985) Shippy (1981), and Saladaga (1981).

First year teachers rated their degree of preparation for teaching using a Likert-type scale with 1 = unprepared and 5 = extremely well prepared. Mean preparedness scores were calculated for each of the following areas: program planning, classroom and laboratory instruction, FFA, supervised occupational experience programs, public relations/advisory committees, and adult education. The scores were summed and averaged for a grand mean preparedness score.

First year teachers also indicated the contribution to their perceived preparedness from three sources, university agricultural education courses, student teaching, and on-the-job/self study. A Likert-type scale with 1 = no contribution and 5 = very high contribution was used to collect the data for each source.

Data were collected as a pilot test to assess the reliability of the instrument from 32 first year teachers outside the southern region. The data were analyzed for internal consistency utilizing Cronbach's alpha as a test for instrument reliability. The reliability of the Likert-type total preparedness scale from the pilot test was alpha = .91. The pilot test participants were asked to indicate from a list of five sources, the most important source of preparedness. Based on the responses from the pilot test, three sources were included on the final instrument.

The final instrument reliability was checked again using the data received from the first year graduates included in the study (N = 59). The reliability as measured by Cronbach's alpha ranged from .94 to .98. The following scale reliabilities were achieved:

1. Self perceived preparedness .97
2. Contribution of univ. agric. educ. courses to preparedness .98
3. Contribution of on-the-job/self study to preparedness .94
4. Contribution of student teaching to preparedness .97

RESULTS

Fifty-nine of the 117 (50.4%) first year teachers responded after two mailings of the questionnaire. A random sample of 30 non-respondents was telephoned and asked selected questions from the instrument. Responses to randomly selected questions from the first year teachers contacted by telephone were not significantly different from those responding by mail.

Preparation to Teach

Overall perceived preparedness for teaching is summarized in Table 1. First year teachers rated their preparation for classroom and laboratory instruction the highest (mean = 3.81). Perceived preparedness for conducting adult education programs was rated the lowest (mean = 2.99). For all areas except adult education, the first year teachers rated their preparation between the categories of acceptable and well prepared.

Sources of Preparedness

Sources of preparedness for each of the six areas of teacher responsibility are shown in Table 2. The contribution of university agricultural education courses, on-the-job/self study, and student teaching are indicated as mean values. On-the-job/self study was rated as providing the greatest overall contribution to preparation

Table 1

Overall Preparedness of First Year Graduates

Area	Mean[a] / SD
Classroom and laboratory instruction	3.81 .72
Future Farmers of America	3.63 .84
Supervised Occupational Experience	3.54 .98
Public Relations/Advisory Committees	3.48 .90
Program Planning	3.30 .78
Adult Education	2.99 1.08
Total Preparedness (Overall Mean)	3.55 .71

[a] 1 = unprepared
2 = poorly prepared
3 = acceptable preparation
4 = well prepared
5 = very well prepared

(mean = 3.56). All sources of preparation were rated as providing between a moderate and high contribution except for the contribution of on-the-job/self study and student teaching towards preparation for adult education.

Factors Contributing to Teacher Preparation

Correlations between perceived total preparedness and selected components of the preservice program and characteristics of the first year teachers are shown in Table 3. The following modified version of a scale offered by Best (1981) was used for interpreting the strengths of the correlations. Values of .00 to .19 are considered negligible; .20 to .39 indicates low correlation; .40 to .59 indicates moderate correlation; .60 to .79 indicates substantial correlation and .80 to 1.00 indicates high to very high correlation.

The highest correlation (r = .84) was between total preparedness and the perceived contribution of university agricultural education courses.

Table 2

Mean Contribution of Sources of Preparedness to Teach by Areas

Area	University AgEd Courses Mean[a] SD	On-the-Job Self Study Mean[a] SD	Student Teaching Mean[a] SD
Program Planning	3.07 .81	3.35 .81	3.14 .80
FFA	3.01 .99	4.00 .70	3.49 1.07
Classroom and Laboratory Instruction	3.46 .86	3.92 .52	3.69 .92
Public Relations/ Advisory Committees	3.44 1.10	3.56 .99	3.32 1.04
Adult Education	3.16 1.09	2.82 1.04	2.56 1.11
Supervised Occupational Experience Programs	3.22 1.22	3.76 .76	3.44 1.11
Total Contribution (Overall Mean)	3.21 .86	3.56 .59	3.28 .84

[a] 1 = no contribution
2 = little contribution
3 = moderate contribution
4 = high contribution
5 = very high contribution

Perceived preparedness was found to be moderately correlated with the factors: contribution of student teaching (r = .57) and effectiveness of university supervisors (r = .53). There was a low correlation between total perceived preparedness and perceived contribution of on-the-job/self study (r = .35), effectiveness of cooperating classroom teachers (r = .28), and grade point average (r = -.24). In this situation, the higher the grade point average, the less prepared the first year teachers perceived themselves.

There were negligible correlations of .13 to .03 between total perceived preparedness and number of university supervisor visits, years of FFA membership, years enrolled in vocational agriculture, hours of agricultural education taken, and length of student teaching.

Table 3

Relationship Between Total Preparedness and Selected Components of the Preservice Program and Teacher Characteristics

Variable	Coefficient	n	Significance
Perceived contribution of agri. ed. courses	.84	48	.001
Perceived contribution of student teaching	.57	47	.001
Effectiveness of university supervisors	.53	59	.001
Perceived contribution of on-the-job/ self study	.35	49	.015
Effectiveness of cooperating teachers	.28	59	.035
Grade point average	- .24	59	.047
Years of FFA membership	.13	55	.346
Number of univ. supervisor visits	.12	59	.365
Years enrolled in vocational agriculture	.06	59	.648
Hours of agricultural education	.04	54	.798
Length of student teaching	.03	59	.805

Note. Pearson correlation coefficients calculated for all variables except grade point average; Kendall's Tau was calculated for this ordinal level variable.

Multiple regression analysis was used to determine the variance in the total preparedness score (dependent variable) explained by the following independent variables: contribution of university agricultural education courses, perceived contribution of student teaching, contribution of on-the-job/self study, number of university supervisor visits to student teaching sites, grade point average, years of FFA membership, perceived overall effectiveness of the cooperating classroom teachers used during student teaching, and the overall effectiveness of university supervision during student teaching. Eleven variables were considered but only those explaining at least 1% or more of the variance in preparedness were used in the regression analysis. Limits to the generalizability of the results should be noted since the total number of cases was 59 and 8 variables were considered in the regression analysis.

The variable that entered first in the stepwise regression was university agricultural education courses with an R^2 value of .61. Sixty-one percent of the variance in the total preparedness score was explained by the contribution of university agricultural education courses. The contribution of student teaching toward total preparedness entered in the second step of the regression analysis explaining an additional five percent of the variance in total preparedness. No other independent variables entered in the regression analysis. Sixty-six percent of the variance in total preparedness was explained by the total combined contributions of university agricultural education courses and student teaching.

CONCLUSIONS

The following conclusions are based on the findings of the study.

1. First year teachers perceive their preparation for teaching as acceptable for all aspects of the vocational agriculture program and feel best prepared for conducting classroom and laboratory instruction.

2. There is an approximately equal contribution from university agricultural education courses, on-the-job/self study and student teaching towards total perceived preparation for teaching vocational agriculture.

3. University agricultural education courses are an important source of perceived preparedness based on the finding that the overall perceived contribution of university agricultural education courses explained the largest percentage (61%) of the variation of the preparedness score.

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Preparedness for Teaching Vocational Agriculture: Perceptions of First Year Teachers

A Critique

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The purpose of this study was to determine the preparedness of first year teachers for teaching vocational agriculture.

Strengths of the Study

1. It is evident that a thorough review of the literature was conducted. A theoretical framework on which this study was developed has been very well presented in the report.

2. The research procedures appear to be sound. Careful steps were taken to test the reliability of the instrument. Follow-up procedures were employed to determine if non-respondents would respond similarly to respondents.

3. A thorough analysis of the data was carried out. Mean scores and standard deviations were reported. Relationships were determined by calculating Pearson correlation coefficients, and a multiple regression analysis was used to determine the variance in the total preparedness score. These statistical procedures appear to be appropriate measures.

Areas to Strengthen

The following suggestions might be considered as a means of strengthening the report:

1. Although the paper is well organized, some ambiguity is prevalent in the following:

    a. The objectives are somewhat vague. I did not get a feel for what your study was about simply by reading the objectives; I had to read the entire report to understand the objectives.

    b. It was difficult to get a feel for what your data collection instrument may have looked like. You referred to having developed a list of competencies, yet the data were grouped by categories. Did you have several competencies in each category and the reported mean scores were calculated as a composite score for that category?

    c. The statistical procedures used were somewhat hidden in the report. I would like to see those reported up front either in a section entitled "Data Analysis" or at the beginning of your presentation of the results.

2. The report presents three conclusions. The addition of some recommendations or implications for agricultural teacher education would add strength to the report.

Although this paper required more study on my part than most others I have read, I found it to be an interesting study. The authors are to be commended for conducting a study that is of interest to our profession.

PROBLEM-SOLVING SKILLS OF AGRICULTURAL EDUCATION UNDERGRADUATES WHEN COMPLETING MATHEMATICAL WORD PROBLEMS IN AGRICULTURAL MECHANICS

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INTRODUCTION

Preparing students to adapt to an ever changing world is one of the primary goals of today's education (Taylor, 1977). Faculty members overwhelmingly endorse the notion that proficiency in problem-solving and decision-making are integral elements of a complete education and essential ingredients for success in a rapidly advancing technological society. Many faculty members contend that they teach and require students to use all six levels of the cognitive process: knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956). However, courses that promote higher-order thinking skills are a rarity on college and university campuses (Fischer & Grant, 1983).

Newcomb and Trefz (1987) evaluated the levels of cognition of tests and assignments in agricultural courses at The Ohio State University. They reported that 37% of the learning was at the remembering (knowledge) level, 44% of the learning was at the processing (comprehension, application, and analysis) level, and 19% at the creating and evaluating (synthesis and evaluation) levels. Although a high percentage of tests and assignments were above the knowledge level, the study did not address the issue of whether the classroom instruction prepared students to perform at the higher cognitive levels expected of them. McKeachie (1963) cautioned faculty members to not assume that students learn higher order skills spontaneously during the process of learning the subject matter.

Gliem and Warmbrod (1985) found that undergraduate agricultural education students completed word problems in agricultural mechanics with only moderate success. In fact, they questioned the students' abilities to effectively teach mathematical problem-solving in high school agricultural mechanics.

Some classes, such as chemistry, physics, and math, are perceived to utilize higher order cognitive processes. William Bennett (1988), Secretary of Education, endorses these classes as key elements in exemplary educational programs. Yet, do students who have completed more math, chemistry, and physics possess higher levels of problem-solving ability? Paul E. Gray (1988) recently stated,

> "Our educational system has produced generation after generation of young people who are ignorant in science and incompetent in mathematics."

The discrepancy between what faculty members report they teach, what they actually teach and what students learn, the recommendation to include more math and science in the high school curriculum along with the fact that problem-solving research at the college level is sparse suggests that additional research in this area is necessary.

PURPOSES AND OBJECTIVES

This study investigated the problem-solving skills in mathematical word problems in agricultural mechanics of undergraduate agricultural education students enrolled in an advanced level laboratory teaching methods course (Agricultural Education 531) and College of Agriculture undergraduate students enrolled in a beginning level applied mechanics course (Agricultural Mechanization and Systems 110). Relationships between students' problem-solving skills and other ability measures were also examined. The specific objectives of this study were to:

1. Measure the problem-solving ability of undergraduate agricultural education students (those enrolled in Agricultural Education 531) and College of Agriculture undergraduate students enrolled in Agricultural Mechanization and Systems 110:
   a. in terms of the number of mathematical word problems correctly solved and
   b. in terms of the logic (procedures, sequence, and mathematical operations) used to determine their answers.
2. Study the relationships between students' problem-solving abilities and their:
   a. number of college agricultural mechanics, math, physics, and chemistry courses completed,
   b. years of high school math, physics, and chemistry completed,
   c. college grade point averages,
   d. ACT composite scores,
   e. ACT math scores, and
   f. ACT natural science scores.

PROCEDURES

A nonequivalent control group design, number 10 (Campbell & Stanley, 1966), was utilized to accomplish the stated research objectives. Thirteen students enrolled in Agricultural Mechanization and Systems 110 at The Ohio State University served as the control group. These individuals represented undergraduate students from several agricultural disciplines and were referred to as agriculture students.

Fifteen undergraduate agricultural education students enrolled in Agricultural Education 531 comprised the experimental group and were referred to as agricultural education students. These individuals were preparing to student teach Autumn Quarter, 1988 or had just completed student teaching.

All students enrolled in the two courses Spring Quarter, 1988 were required to take a problem-solving test at the beginning of the quarter and complete a personal information questionnaire. The problem-solving test had been previously developed by a panel of experts in agricultural mechanics instruction. The test was designed to measure a student's ability in solving mathematical word problems in agricultural mechanics. The panel was composed of selected teachers of vocational agriculture and professors of agricultural mechanization. The test was revised slightly and re-evaluated for content validity by a panel of experts.

The authors evaluated the level of logic used to calculate each answer (students were asked to show all their work). A score of 3 equaled high logic, 2 equaled some logic, and 1 equaled no logic.

Reliability of the instruments was measured using Cronbach's alpha. The reliability of the test questions was 0.72 and the logic assessment was 0.80.

College GPA and ACT scores were obtained from the students' college records.

Problem-solving ability, the dependent variable, had two levels. First, it was determined by the student's score on the problem-solving test. The level of logic used to solve the mathematical word problems in agricultural mechanics was the second measure of the student's problem-solving ability.

The independent variables included: the number of college agricultural mechanics, math, physics, and chemistry courses completed; the years of high school math, physics, and chemistry completed; college GPA; and ACT scores (composite, math, and natural science).

ANALYSIS OF DATA

All data were coded and appropriate statistical procedures were used for measures of central tendency, correlation, regression, t-test, and analysis of covariance (alpha = 0.05). The SPSS/PC+ statistical package was used for data entry and analyses.

RESULTS

A t-test revealed that a significant difference on ACT scores existed between the two groups (Table 1). Thus, an ANCOVA with ACT composite scores as the covariate was performed.

Table 1

ACT Scores for. Undergraduate Agricultural Education Students and Undergraduate Agriculture Students

	Agricultural Education Students (n=15)		Agriculture Students (n=13)		
ACT Test	Mean	SD	Mean	SD	t-value
Composite	17.75	3.57	22.55	3.56	-3.22*
Math	16.42	5.68	23.00	6.15	-2.66*
Science	20.08	5.02	27.09	3.70	-3.83*

* $p \leq .05$.

Undergraduate agricultural education students scored lower on the fourteen-item test (Mean = 8.0 or 57%; SD = 2.8; Median = 9; Mode = 9) than the College of Agriculture undergraduate students (Mean = 8.8 or 63%; SD = 2.5; Median = 9; Mode = 8, 10, and 12) (Table 2). A significant difference on the number of items correct was found between the two groups (Table 3).

Table 2

Frequency and Percentage Distribution of Student's Scores on the Mathematical Word Problems in Agricultural Mechanics Test

Agricultural Education Students n = 15				Agriculture Students n = 13			
Score	Freq	%	Cum %	Score	Freq	%	Cum %
3	2	13.3	13.3	5	2	15.4	15.4
5	1	6.7	20.0	6	1	7.7	23.1
6	1	6.7	26.7	8	3	23.1	46.2
7	1	6.7	33.3	9	1	7.7	53.8
8	2	13.3	46.7	10	3	23.1	76.9
9	4	26.7	73.3	12	3	23.1	100.0
10	2	13.3	86.7	Total	13	100.0	100.0
11	1	6.7	93.3				
13	1	6.7	100.0				
Total	15	100.0	100.0				
Mean=8.0	S.D.=2.8	Mode=9	Median=9	Mean=8.8	S.D.=2.5	Mode=8,10,12	Median=9

The average logic scores were 28.8 or 69% out of a possible 42 (SD = 6.3; Median = 30; Mode = 34) for the agricultural education students and 31.2 or 74% (SD = 5.6; Median = 31; Mode = 35) for the agriculture students (Table 3). A significant difference was not found between the two groups for the use of logic on the mathematical word problems in agricultural mechanics.

Agriculture students completed more (5.73) high school math, chemistry, and physics courses than did agricultural education students (4.07), but agricultural education students completed more (6.80) university math, chemistry and physics than the agriculture students (4.45). A significant difference on the number of high school math, chemistry, and physics courses completed was found between the two groups (Table 3).

Agricultural education students earned higher college GPAs (2.79) than agricultural students (2.54). A significant difference was not found between the two groups for college GPA (Table 3).

Table 3

Comparison of Selected Variables between Undergraduate Agricultural Education Students and Undergraduate Agriculture Students with ACT Composite Scores as the Covariate

	Agricultural Education Students (n=15)		Agriculture Students (n=13)		
Variable	Mean	SD	Mean	SD	F-value
Items correct	8.00	2.80	8.85	2.48	3.318*
Logic Score	28.80	6.25	31.20	5.60	1.294
Years of high school chemistry, math, and physics	4.07	1.49	5.73	1.27	4.222*
College GPA	2.79	0.48	2.54	0.50	0.964

* $p \leq .05$.

A positive substantial association was found between the number of items correct and the ACT composite score (r = .68) and the ACT math score (r = .67). A moderate association was found between the number of items correct and the ACT science score (r = .43), and the years of high school math, chemistry, and physics completed (r = .41).

A very strong relationship existed between the use of logic and the ACT composite score (r = .71). A substantial relationship was found between the use of logic and the ACT math score (r = .60) and the ACT science score (r = .51). A moderate association existed between the use of logic and the years of high school math, chemistry, and physics completed (r = .45).

Regression analysis established that the ACT composite score was the best predictor of students' success on mathematical word problems in agricultural mechanics (Tables 4 and 5).

Table 4

Summary Data for Regression of Mathematical Word Problems in Agricultural Mechanics Test Score on ACT Composite Score
n = 28

Variable	Intercorrelations X_1	Y	Mean	S.D.
ACT Composite Score (X_1)	1.00	.52	20.04	3.84
Test Score (Y)		1.00	8.39	2.64

Table 5

Regression of Score on Mathematical Word Problems in Agricultural Mechanics Test on ACT Composite Score
n = 28

Variable	Partial Regression Coefficient	t	p
ACT Composite Score	0.36	3.11	.005
(Constant)	1.22		

R^2=0.27; p $\leq$.05; Standard Error=2.30

CONCLUSIONS AND RECOMMENDATIONS

This study supports Gray's statement for this group of students and would suggest that those undergraduates in this study preparing to be vocational agriculture teachers are not as competent in problem-solving skills involving mathematical word problems in agricultural mechanics than the thirteen agriculture students. The following conclusions support this claim.

1. Undergraduate agricultural education students and College of Agriculture undergraduate students in this study were not competent in solving mathematical word problems in agricultural mechanics.

2. The undergraduate agriculture students completed more high school math, physics, and chemistry courses then the undergraduate agricultural education students and answered more items correctly on the mathematical word problem test in agricultural mechanics, but both groups performed at unsatisfactory levels.
3. The fifteen undergraduate agricultural education students completed more university math, chemistry and physics courses than the thirteen

undergraduate agriculture students, but scored lower on the mathematical word problem test in agricultural mechanics.

4. ACT composite scores were the best predictors of students' scores on the agricultural mechanics mathematical problem-solving test.

5. Additional research is recommended to answer the following questions:

   a. How can we in teacher education better prepare students in problem-solving skills? Are more math, chemistry, and physics courses the answer, or should educators emphasize problem-solving skills in the courses which students are currently enrolled?

   b. If these undergraduate agricultural education students were not competent in mathematical word problems in agricultural mechanics, can it be assumed that other agricultural education students are not competent in mathematical word problems in agricultural mechanics. Furthermore, can it be assumed that vocational agriculture teachers are not competent in mathematical word problems in agricultural mechanics? How can we in teacher education provide problem-solving inservice education to assist vocational agriculture teachers, if they are found to perform unsatisfactorily?

   c. How do students become better problem-solvers?

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Problem Solving Skills of Agricultural Education Undergraduates When Completing Mathematical Word Problems in Agricultural Mechanics

A Critique

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This study investigated the problem solving skills of two groups of students; one a group of undergraduate Agricultural Education students enrolled in an advanced methods course and the other a group of undergraduate agriculture majors enrolled in an agricultural mechanics course. This seems to be a very timely and appropriate topic since agricultural educators continue to place so much emphasis on the problem solving approach to education. The researchers presented a proper and convincing rational for conducting a study on this topic. Correct research design and procedure appear to have been followed. Conclusions and recommendations were worded so as to be consistent with the data and findings.

The following are my concerns for the study:

1. What generalizations can be made from the study? Can we assume that if the study were repeated another quarter using different students from these classes, the results would be the same? Given the small n for both groups, I doubt that any generalizations can be made. However, the researchers were careful not to make generalizations beyond the study groups.

2. How will the study be used? The study could possibly be used as a pilot for instrument and procedural development, but a much larger population and/or sample is needed before action is taken based on the conclusions and recommendations of the study.

RELATIONSHIP OF SUPERVISED OCCUPATIONAL EXPERIENCE PROGRAM SCOPE TO STUDENT ACHIEVEMENT IN VOCATIONAL AGRICULTURE

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INTRODUCTION AND THEORETICAL FRAMEWORK

Supervised occupational experience (SOE) programs have traditionally been a vital component of vocational agriculture and agricultural educators continue to recognize SOE as an integral part of vocational agriculture. A recent national study found that over 98% of the profession agreed that SOE should be required of all vocational agriculture students in grades 9-12 (Sutphin and Newcomb, 1983). As a goal, all students should participate in worthwhile SOEs while enrolled in vocational agriculture programs (National Research Council, 1988).

Research has been conducted to investigate the relationship between student achievement and participation in SOE (Christensen, 1964; Cushman, Hill, & Miller, 1968; Cheek & McGhee, 1985; McGhee & Cheek, 1988; Neavill, 1973). However, only two studies (Morton, 1978 and Potter, 1984) investigated the relationship between the scope of a student's SOE and his or her level of achievement in vocational agriculture. Morton (1978) found a positive relationship between achievement test scores and the scope of SOE, opportunity to engage in SOE, grade point average, years in vocational agriculture, and the number of SOE visits received by students from their instructor on an annual basis. Potter (1984), who focused on handicapped students, found no significant relationship between SOE scope and student achievement. Other variables which he found to be positively related to student achievement included FFA involvement and parental encouragement.

Further research needs to be conducted to determine the extent to which SOE influences student achievement. Additional research should consider the unique situations within other states and other extraneous variables related to student achievement not measured by Morton (1978) and Potter (1984). A comprehensive review of the literature suggested, that in addition to SOE involvement, student performance on an achievement test can be related to: student interest in the subject area (Sjoberg, 1984; Christensen, 1964; Neavill, 1973); FFA involvement (Smith, 1983; Potter, 1984; Long & Isrealsen, 1983; Cheek & McGhee, 1985; McGhee & Cheek, 1988); years of previous enrollment in vocational agriculture (Morton, 1978); parental involvement and expectations (Gigliotti & Brookover, 1975; Seginer, 1983; Caroselli, 1980; Christensen, 1964); cumulative grade point average (Christensen, 1964; Morton, 1978); and teacher effectiveness (Rosenshine & Furst, 1971; Dunkin & Biddle, 1974).

PURPOSE AND OBJECTIVES

The primary purpose of this study was to determine the relationship between the scope of SOE, as measured by total Productive Man Work Units (PMWU), and the level of achievement for students who were enrolled in vocational agriculture in Florida. The primary research hypothesis was that: There is a positive relationship between the scope of an SOE and the level of achievement on a test designed to measure technical knowledge in vocational agriculture. In addition to the primary hypothesis, the following alternate rival hypotheses were considered: There is a positive relationship between student achievement and the following independent variables: cumulative grade-point-average; parental expectations and encouragement; number of years spent in vocational agriculture; student involvement in FFA; student interest in agriculture; and teacher effectiveness as indicated by clarity, variability, enthusiasm, business-like behavior, student opportunity to learn the material, and indirectness.

PROCEDURES

Population and Sample

The population consisted of public high schools offering one or more of four classes of vocational agriculture in Florida. These classes were livestock production, ornamental horticulture, fundamentals of agriculture (9th grade), and applied principles of agriculture (10th grade). The latter two classes were selected because most students complete them prior to entering specialized classes. Livestock production and ornamental horticulture were selected because they were the two specialized classes with the largest student enrollments. From this population, a purposive sample of 12 schools was taken in the 1985-86 school year. The design of this study was ex-post facto in nature. The independent variable (SOE scope) had already occurred and the research began with the measurement of the dependent variable. Data were collected from 498 students in the sample schools through on-site administration of the instruments by the researchers. Students who were absent on the day data were collected completed the instruments when they returned to school. Therefore, 100% of the students at each school participated in the study.

Instrumentation

Four instruments were used: multiple choice tests designed to measure technical knowledge in each of the four classes; a questionnaire regarding the type and scope of their SOE; a demographic questionnaire designed to collect information related to FFA involvement, length of enrollment in vocational agriculture, interest in agriculture, teacher effectiveness, and parental expectations and encouragement; and a grade-point-average form to be completed by the guidance counselor at each school.

Items for the livestock production achievement test were selected from a test item bank for cattle ranchers (Maday, 1983) and had a Kuder-Richardson reliability coefficient of .89. Items for the ornamental horticulture achievement test were selected from two test item banks (McCall & Farrington, 1982; Maday, 1985) and had an average Kuder-Richardson 20 correlation coefficient of .94. Items for the fundamentals of agriculture achievement test were selected from a test item bank developed for fundamentals developed by McGhee and Cheek (1983) and had an average Kuder-Richardson reliability coefficient of .80. The items for the applied principles achievement test were taken from a series of test item banks developed by Cheek and McGhee (1983, a, b, c, d, e, f) and had an average Kuder-Richardson reliability coefficient of .88. Data related to each student's SOE program were collected by means of a written questionnaire which was administered with the achievement test. Students were asked to provide information relating the type and scope of their SOE and an SOE scope score was calculated. All data were collected by the researchers through on-site visits.

DATA ANALYSIS

Achievement tests were scored and students were assigned raw scores for each of the independent variables. SOE scope was calculated according to the formula:

$$S = \frac{I}{100} + \frac{PMWU}{5}$$

Where: S = scope score for the SOE program
I = total income for the 1984-5 school year
PMWU = estimated productive man work units for the 1984-5 school year

Income was defined as the net income of a student's ownership projects and net receipts from a student's placement work experience. A PMWU was defined as the work accomplished by one person in a 10-hour work day with typical levels of production practices and equipment. This formula was used to measure SOE scope because several researchers have used productive man work units to measure SOE scope. McMillion and Auville (1976) examined factors associated with the success of supervised farming programs of Virginia high schools using a similar formula called productive man work days to measure SOE scope. Morton (1978) used the PMWU formula to determine SOE scope scores in order to study the relationship between quality of SOE program and student achievement. Later, Arrington (1981), using the PMWU formula, determined SOE scope scores to examine the relationship of length of teacher contract to SOE scope and FFA chapter activity level.

Descriptive statistics were calculated for each variable studied. Pearson product moment correlation coefficients were calculated and step wise multiple regression analysis was performed. The .05 level of significance was set as the critical standard.

RESULTS

Characteristics of Students

Student achievement test scores ranged from 12.5% to 95% with a mean score of 60.2%. The mode was 75% and the median was 61.9% and the standard deviation was 16.4. Table 1 illustrates that the minimum SOE scope was 0 and the maximum value was 131.5. The mean scope was 7.1, the median was .23, the mode was 0, and the standard deviation was 15.1.

Table 1
Supervised Occupational Experience Program Scope

Scope	N	%	Cumulative %
0.00	236	47.5	47.5
0.01-0.24	16	3.2	50.7
0.25-7.12	121	24.3	75.0
7.12-131.48	124	25.0	100.0
Total	497	100.0	

Each student answered questions regarding their involvement in FFA activities and contests. Each activity was assigned a point value and responses were totaled to yield a FFA involvement score. Seventy-four percent of the students were FFA members. The FFA involvement scores ranged from 0, or non-membership, to a maximum value of 45. The mean value was 5.0, the median value was 2.0, the mode was 0, and the standard deviation was 7.3.

Student interest in agriculture was measured by a series of questions using a five point scale (5=high interest, 1=low interest). The mean interest score was 3.63 with a standard deviation of .91. Both the mode and median were 3.66. Seventy-two percent of the students had an interest score of 3.01 or higher.

Students were asked to react to six statements about the teaching effectiveness of their vocational agriculture teacher. Each question was answered using a five point scale (5=high teacher effectiveness, 1=low teacher effectiveness), and responses were averaged to give a composite teacher effectiveness score. The lowest score assigned was 1.0 and the highest value was 5.00. The mean teaching effectiveness score was 3.99, the median was 4.00, the mode was 4.00, and the standard deviation was .74. Slightly more than 79% of the students rated their teacher 3.50 or higher, and 48.8% rated their teacher 4.01 or higher.

Parental involvement and encouragement was assessed by asking students to indicate their level of agreement on a five-point scale (5=strongly agree, 1=strongly disagree) with statements regarding parents' encouragement and expectations of them. The mean score was 3.71 with a standard deviation of .63 which indicates that students were receiving some encouragement from their parents. The median was 3.75 and the mode was 4. The scores ranged from 1.25 to 5.0.

Over 85% of the students had completed 1 or more years of vocational agriculture prior to enrolling in their current course. The mean number of years was 2.25. The average cumulative grade point average was 2.27 on a 4.0 scale and a standard deviation of .75 was calculated.

Relationships Between the Major Variables

The Pearson correlation analysis (see Table 2) indicated statistically significant (P<.05), positive relationships between student achievement and the following independent variables: GPA (R=.24), years previously enrolled in agriculture (R=-.20), student interest in agriculture (R=.17), and parental interest and involvement (R=.10). The additional variables measured in the study showed no significant relationship with the dependent variable.

Table 2
Pearson Product Moment Correlation Coefficients for the Major Variables

Variables	ACH	SOE	FFAI	YPE	INT	PIE	TE	GPA
Achievement	-----							
SOE Scope	-.005	-----						
FFA Involvement	-.005	.385*	----					
Years Previously Enrolled	-.199*	.351*	.415*	----				
Interest In Agriculture	.170*	.208*	.369*	.219*	-----			
Parental Involvement and Expectations	.097*	.125*	.119*	.102*	-.171*			
Teacher Effectiveness	.083	.073	.095*	.093*	.329*	.347*	-----	
Grade Point Average	.238*	.116*	.142*	.077	.024	.220*	-.052*	----

*Significant at the p<.05 level.

A step-wise multiple regression analysis was used to determine the degree to which the independent variables explained variance in student achievement (see Table 3). This analysis partials out the effects of a single variable at each step, while the other variables are statistically controlled. Three variables were found to be statistically significant in explaining variance in student achievement: GPA; years in agriculture; and student interest in agriculture. Combined, they explained almost 16% of the variation in achievement test scores.

Table 3
Step-Wise Multiple Regression of Achievement Test Score on Selected Independent Variables

Variable	Partial R2	R2	F	Probability of F
GPA	0.0569	0.0569	24.6332	0.0001
Years Previously Enrolled	0.0520	0.1089	23.7456	0.0001
Interest in Agriculture	0.0468	0.1557	22.5009	0.0001

CONCLUSIONS

The following conclusions were drawn based on the findings of this study:

1. Supervised occupational experience scope was not related to student achievement in vocational agriculture.

2. GPA and student interest were positively related to student achievement in vocational agriculture. Years in agriculture was negatively related to achievement. All other extraneous independent variables were not related to achievement.

3. Based upon the step-wise multiple regression analysis, which statistically controls the effect of other independent variables related to student achievement, three variables were found to be statistically significant. Those variables were GPA, student interest in vocational agriculture, and years in agriculture. These variables combined accounted for 16% of the variance in student achievement.

RECOMMENDATIONS

1. Further research needs to be conducted to reconcile the conflicting results of this study with previous and concurrent research, concerning not only the dependent and main independent variables but also the other independent variables not found to be related to student achievement in this study. Future studies should investigate additional variables that might explain variance in student achievement, such as opportunity to conduct an SOE, student ability as measured by methods other than GPA, and the amount of supervision students are receiving with their SOE program.

2. Low SOE scope scores indicate that efforts must continue to identify and assist with problems teachers are having in implementing SOE.

3. Better measures of supervised occupational experience program quality for all areas of agricultural education need to be developed.

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Relationship of Supervised Occupational Experience Program Scope To Student Achievement in Vocational Agriculture
A Critique

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Extensive research has focused on the function of supervised occupational experience as a major component of the vocational agriculture program. This study is important as the profession engages in redefining the purpose, needed quality, and benefits of practical agricultural experience in view of current program changes.

The authors established a sound theoretical framework for their research through an extensive literature review. Major findings from the literature provided a rationale for selecting variables for this study. The purpose, primary research hypothesis, and rival hypotheses were clearly stated.

Appropriate procedures were followed given an ex-post facto study with a purposive sample and, for the most part, procedures were explained in great detail. A purposively selected sample is based on "expert judgment" as to the typicality of the sample. The sampling variance can only be approximately estimated in accordance with a "guesstimate" as to what sort of probability sample the subjects most nearly resemble. It would be helpful for the reader to know the rationale for selecting the 12 schools in an attempt to diminish concerns about researcher bias. Since on-site data collection techniques were used, economical data gathering and available time may have constituted the rationale. Responses from 498 subjects should reduce the threat of sampling error due to the size of the sample. Delimitations of the study need to be stated. Are the implications of the study generalizable to vocational agriculture in Florida or only to a particular region in Florida ? The authors established a follow-up procedure and are to be commended on attaining 100% participation of the selected subjects thus controlling for non-response error.

Internal consistency measures of reliability for the technical knowledge tests were established. There is some concern about the validity of the instruments. The authors need to explain how they established the construct validity of the technical test and content validity of the demographic questionnaire. Were test items randomly selected from the state test banks ? How well do the tests reflect the agriculture content taught in programs studied ?

Appropriate techniques were used in the data analysis. The authors noted positive significant relationships. However, the practical significance of the correlation coefficients should also be discussed using either Hinkle, Wiersma, & Jurs or Davis Conventions.

The conclusions reflected the findings of the study. A conclusive statement as to the implication of the finding would be meaningful. Hopefully the authors will follow their recommendations for further study and investigate why the SOE scope scores are so low. Is it too early for students in the ninth or tenth grade to have substantial SOE programs that influence student achievement? Also, attempt to identify variables which further explain the variance in student achievement when related to SOE, especially variables unique to Florida.

Congratulations on a well written study. The author's thematic research contributes to the body of knowledge about supervised agricultural experience and should prove to be very useful to program planners in Florida.

RESEARCH INITIATIVES FOR AGRICULTURAL EDUCATION: A NATIONAL DELPHI USING EXTERNAL DECISION-MAKERS

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This paper reports research conducted at Mississippi State University.

INTRODUCTION

"Progress during the past years in the technological and methodological aspects of research (in agricultural education) has not been accompanied by comparable improvements in another very important aspect of research, namely, the relevance, significance, and importance of problems and issues that we investigate . . . I propose that our highest priority for continuing progress in research in agricultural education must be that we pay greater attention to the significance and importance of the problems and issues that we research" (Warmbrod, 1986, p. 9). Similar concerns regarding issues, focus, and programmatic efforts have been expressed by Krebs (1976), Mannebach (1980), Moore (1987), Stewart, Shinn, and Richardson (1977), and Vaughn (1983).

Data to base research decisions and develop a research agenda for agricultural education are incomplete; therefore, expert opinion and intuition tempered with the sound judgement of agricultural professionals must be utilized. Utilizing expert opinion is an acceptable alternative in the absence of a knowledge-base upon which decisions can be made (Helmer, 1966).

Nash (1978) suggested that if experts in the field under investigation hold the most powerful positions, it is likely that their opinions will come to pass. Knowledge of the perceptions of those individuals who have power could provide focus and direction to the research efforts of agricultural education. Two assumptions underlie this investigation: administrators (decision-makers in the approval and support of research) possess knowledge of research and have the power to influence change, and; meaningful and important research is being conducted by the top research universities in the United States. Following these assumptions, deans of resident instruction in colleges of agriculture (DAG), directors of experiment stations (DIR), and deans of education (DED) from the top 100 research institutions having programs of agricultural education (N=31 universities) were identified and invited to participate as expert external advisors (The Chronicle, 1987).

PURPOSE AND OBJECTIVE

The purpose of the study was to develop a consensus document that could provide the beginnings of a knowledge-base, and focus and direction to research in agricultural education. The primary objective was to identify and prioritize research initiatives important to the profession.

PROCEDURES AND ANALYSIS

The investigation was conducted in four parts, each part moving closer to satisfying the objective. Delphi was the research procedure most congruent with the purpose and objective of the study (Dalkey, 1969; Helmer, 1967; Linstone and Turoff, 1975). The Delphi technique is a method of eliciting and refining group opinions. The procedure is based on iterative and controlled-feedback interactions.

Pre-data collection: Experts were identified from current and appropriate frames, a prototype Delphi instrument was developed and validated, and experts were invited to participate. The initial questions were determined through formalized discussions and futuring techniques with opinion leaders in agricultural education. A panel of internal experts was then asked to validate the Round 1 questions and the research procedures. An individually prepared letter describing the purpose, objective, and procedures of the study was sent to each invited participant. This established an open dialogue that would involve an important commitment of time; therefore, only those experts who could allocate dedicated time and felt they had expertise were included.

This investigation was a study of expert opinion. The process was iterative; reliability could not be expressed in terms commonly observed in the profession. This does not mean that reliability is not a concern when studying expert opinion. The Rand Corporation (1969), in extensive studies of the Delphi technique, found process reliability to be a function of group size. When the number of participants per advisory group was greater than 13, questions of process reliability were satisfactorily answered; mean correlations were greater than 0.80 (Dalkey,1969).

Rating the Opinions: Opinions in the broadest sense were collected through the objective-driven Round 1 Delphi instrument. The Round 1 instrument was mailed to all invited experts; three advisors from each of the 31 identified universities. Individually prepared follow-up letters were sent to encourage participation.

Round 1 responses were converged and incorporated into the Round 2 instrument. The researchers did not edit the content of the Round 2 instrument. Round 2 was mailed to all invited advisors. Experts were asked to respond using a six-point Likert-type scale describing their strength of agreement to the random listing of the opinions forwarded through Round 1. Summary statistics were then calculated per advisory group per Round 2 item. The Round 2 participants from each of the three external advisory groups became the intact groups for the remainder of the investigation.

Developing Consensus: Frequency distributions were used to distill and refine the Round 2 responses. Those statements where more than 50% of any one of the three advisory groups chose to 'agree' (rating of 5) or 'strongly agree' (rating of 6) represented consensus and were included in the Round 3 instrument. The Round 3 instrument was mailed. Each expert received the percentage agreeing or strongly agreeing for their group, for the other two groups, and their initial rating of the statements. The experts were then instructed to reevaluate the statements in light of the additional information provided through the summary statistics.

Analysis of Data: Round 3 responses were analysed using summary statistics. Frequencies were again used to distill and refine responses. Findings were used to develop a consensus document that can provide focus and direction to research efforts in agricultural education.

FINDINGS

Letters of invitation were sent to three experts from each of the 31 identified research institutions. Fifty-four expert advisors responded to our request by completing the Round 1 Delphi instrument, by composing detailed letters, or by telephone. Five expert advisors chose not to participate in Round 1, yet requested to participate in the subsequent Rounds.

The Round 2 instrument received responses from 14 DAG, 15 DIR, and 15 DED. The remaining dialogue was limited to these groups. All Round 2 participants responded to the Round 3 instrument. The combined responses of the three expert advisory groups to the initial communication identified 74 research initiatives. Selecting statements where 50% or more of the experts from any one of the advisory groups 'agreed' or 'strongly agreed' reduced the number of research initiatives to 34. Round 3, the final round, further reduced the list to 19, 14, and 20 for DAG, DIR, and DED, respectively. These remaining research initiatives represent consensus of agreement within each expert advisory group (Table 1).

All groups concurred for seven initiatives; 1) identify concepts that can be taught via technology, 2) identify innovative instructional technologies, 3) identify science content of contemporary programs in agriculture, 4) improve evaluation of teachers and teaching, 5) research the viability of traditional high school vocational agriculture programs, 6) further the research base in critical thinking and problem-solving, and, 7) answer significant and important questions about educcational methodologies in teaching and learning.

DAG and DED were in agreement for six initiatives; 1) increase student achievement, 2) improve teacher preparation, 3) improve faculty development, 4) answer significant and important questions about philosophy, aims, purposes, and goals of agricultural education, 5) increase numbers of minority students in agricultural education, and, 6) improve the teaching of basic and academic skills.

DIR concurred with DAG for three initiatives; 1) determine the most effective way of keeping agriculturalists abreast of technological advancement, 2) evaluate consequences of increasingly restrictive university admission standards on vocational agriculture programs, and, 3) determine competencies needed for employment in the broad field of agriculture, and with DED for one additional initiative; conduct longitudinal studies showing clear paths and accomplishments of students completing agricultural education programs.

DAG, DIR, and DED had 50% or more experts within their groups agreeing or strongly agreeing independently for three, two, and six initiatives, respectively (Table 1).

CONCLUSIONS AND RECOMMENDATIONS

Delphi provides a window into the perspectives of decision-makers who can impact research in agricultural education. The views of the external experts are important; they demonstrate similarities between groups as well as unique differences. Their views represent the beginnings of a knowledge-base that can be used to assist the establishment of a programmatic research effort in agricultural education.

The research initiatives should be:

1. focused and articulated to take advantage of the knowledge and talents within the profession;

2. clustered to reflect the focus and direction of different organizational structures, i. e., agriculture, experiment station, education; and,

3. refined by internal decision-makers. Objectives should be developed leading to researchable problems, which if pursued rigorously, will lead to clear solutions.

TABLE 1

Research Initiatives: The Opinions of External Experts

A. DEANS OF RESIDENT INSTRUCTION IN AGRICULTURE			B. DIRECTORS OF EXPERIMENT STATIONS			C. DEANS OF EDUCATION		
92.8%	BC	Identify concepts that can be effectively taught via technology.	92.9%	AC	Identify innovative instructional technologies related to procedures and materials in agricultural education.	78.6%	AB	Improve evaluation of agricultural teaching/teachers.
92.8%		Identify strategies to motivate teachers to teach effectively.	78.6%	A	Determine the most effective methods for keeping agriculturists abreast of technological advancement.	78.6%	A	Increase student achievement.
85.7%	BC	Identify the science content of contemporary programs in agriculture.	71.5%		Analyze present educational programs and their effectiveness; e.g., 4-H, Vol. Agriculture, Ag in the classroom Colleges of Agriculture.	71.4%	AB	Identify concepts that can be effectively taught via technology.
78.6%		Develop teaching competence of high school and university faculty.	64.3%	AC	Identify concepts that can be effectively taught via technology.	71.4%		Research effective education for special needs populations in agriculture.
78.6%	BC	Identify innovative instructional technologies related to procedures and materials in agricultural education.	64.3%		Focus on theoretical concepts of learning, as it applies to the broad fields of agriculture for youth and adult levels.	64.3%	A	Answer significant and important questions about philosophy, aims, purposes, and goals of agricultural education.
71.5%	C	Improve teacher preparation.	64.3%	A	Evaluate the consequences of increasingly restrictive university admission standards on vocational agriculture programs.	64.3%		Investigate effectiveness of various instructional strategies and learning characteristics, e.g., age, sex, ability level, cultural isolation, personality variables, etc.
71.4%	BC	Improve evaluation of agricultural teaching/teachers.	64.3%		Develop, test, and evaluate the efficiency of information delivery systems in agriculture.	64.3%	B	Conduct longitudinal studies showing clear paths and accomplishments of students completing agricultural education programs.
71.4%	C	Increase student achievement.	57.2%	AC	Answer significant and important questions about educational methodologies in teaching/learning.	64.3%	A	Investigate ways to increase numbers of minority students in agricultural education.
64.3%	C	Improve faculty development.	57.2%	A	Determine competencies needed for employment in the broad field of agriculture.	64.2%	A	Improve effective faculty development.
64.3%	BC	Research the viability of traditional high school vocational agriculture programs.	57.1%	AC	Further the research base in critical thinking and problem-solving.	61.3%	AB	Identify innovative instructional technologies related to procedures and materials in agricultural education.
64.3%	B	Evaluate the consequences of increasingly restrictive university admission standards on vocational agriculture programs.				57.2%	AB	Further the research base in critical thinking and problem solving.
64.3%	C	Investigate ways to increase numbers of minority students in agricultural education.						
64.2%	B	Determine the most effective methods for keeping agriculturalists abreast of technological advancements.						

Table 1 continued

Research Initiatives: The Opinions of External Experts

A. DEANS OF RESIDENT INSTRUCTION IN AGRICULTURE		B. DIRECTORS OF EXPERIMENT STATIONS		C. DEANS OF EDUCATION	
57.1% BC	Further the research base in critical thinking and problem solving.	57.1% AC	Research the viability of traditional high school vocational agriculture programs.	57.2% AB	Research the viability of traditional high school vocational agriculture programs.
57.1%	Research effects of culture on adoption-diffusion of agricultural technology.	50.0% AC	Improve evaluation of agriculture teaching/teachers.	57.1% A	Improve teacher preparation.
50.0% C	Answer significant and important philosophy, aims, purposes, and goals of agricultural education.	50.0% C	Conduct longitudinal studies showing clear paths and accomplishments of students completing agricultural education programs.	50.0% AB	Answer significant and important questions about educational methodologies in teaching/learning.
50.0% BC	Answer significant and important questions about educational methodologies in teaching/learning.	50.0% AC	Identify the science content of contemporary programs in agriculture.	50.0%	Determine how agricultural education can meet the needs of students for our future work force.
50.0% B	Determine competencies needed for employment in the broad field of agriculture.			50.0%	Investigate the uses of the computer in agricultural education.
50.0% C	Improve the teaching of basic and academic skills in agriculture.			50.0% A	Improve the teaching of basic and academic skills in agricultural education.
				50.0% AB	Identify the science content of contemporary programs in agriculture.
				50.0%	Investigate strategies for collaboration among researchers across institutions and subject areas.
				50.0%	Study knowledge representation in junction with artificial intelligence and expert systems.

NOTE: Percentages represent the percentage of the advisory group 'agreeing' or 'strongly agreeing' (rating of 5 or 6) with the initiative.

Prefix letters per research initiative represent agreement with the opinions of the expert group as identified below.

A - Deans of Resident Instruction in Agriculture

B - Directors of Experiment Stations

C - Deans of Education

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RESEARCH PRIORITIES IN AGRICULTURAL EDUCATION IN THE UNITED STATES

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INTRODUCTION

Teacher educators in agriculture have a mandate to conduct and disseminate state and national level research for the agricultural education profession. Mannebach, Mackenna, and Pfau (1984) noted that the profession depends on research to chart its course. Yet, research in agricultural education sometimes lacks a programmatic focus and there is too little agreement on the research priorities for the profession to focus its attention and resources (Mannebach, 1981; Miller and Warmbrod, 1982).

Stewart Shinn and Richardson (1977) , commissioned by the Research Committee of the Agricultural Education Division of the American Vocational Association to determine the problems challenging agricultural education, found fourteen areas of concern. The concerns provided both implications for research and a source of researchable problems. Warmbrod (1987) felt that problems for research in agricultural education should be broadened to include extension education, communications, nonvocational education in agriculture, postsecondary education, and agricultural education in higher education. Research in agricultural education also needs more sophistication (Lee ,1985), continuity (Vaughn, 1986), and focus on salient problems (McCormick, 1985). Some educational disciplines and professional organizations establish national research priorities. The agricultural education profession has neither established national research priorities nor identified a contemporary list of researchable topics.

PURPOSE AND OBJECTIVES

The purpose of this descriptive study was to determine research priorities for agricultural education and to determine whether these priorities should be addressed at the national, regional or state levels. It should lead to further discussion, delineation of programmatic research and recommendations to improve research in the profession. This study closely follows the conceptual framework proposed by Stewart, Shinn, and Richardson (1977).

Objectives for the study were:

1. Identify research priorities in agricultural education, in general, and by specified research categories.

2. Determine the priority levels of individual research priorities in agricultural education, and by specific research categories.

3. Determine if agricultural education department heads rate priority levels differently than teacher educators identified as research experts.

4. Determine if certain research priorities should be addressed at the national, regional or state level.

5. Determine if the perceptions of department heads and research experts on the research priorities differ between the four regions of the AATEA.

6. Provide recommendations to improve research in agricultural education.

PROCEDURES

A purposely selected sample of thirty-seven (37) research experts in agricultural teacher education, and sixty-two (62) agricultural education department heads was taken from the 1987 Directory of Teacher Educators in Agriculture. The respondents were nominated independently by the national and regional editors of the Journal of the American Association of Teacher Educators in Agriculture and the chairman of the AATEA national research committee. Of the target population, thirty-four (n=34) research experts and forty-nine (n=49) department heads responded to a mailed questionnaire for an eighty-four percent (84%) response rate. Two follow-up letters were mailed. To account for nonrespondent differences early respondents were compared with late respondents. No significant differences were found with the T test .

The instrument included one hundred and nine (109) research topics in thirteen (13) categories identified from the literature and by a review panel. The review panel consisted of agriculture teacher educators, supervisors, secondary teachers, educational philosophers, educational psychologists, curriculum and instruction specialists, and researchers and statisticians outside agricultural education who were leaders of professional organizations and/or expert researchers.

The questionnaire was submitted to another panel to establish content validity. They found it to be content valid. The instrument was field tested with agriculture teacher educators who received at least one nomination as research experts but were not part of the study sample. A Cronbachs Alpha reliability coefficient of .96 was determined from the field test.

Respondents were asked to rate the level of priority for each research topic on a Likert scale (0-5). They also checked a category to show whether the topic was national, regional, or state level and were invited to write in additional research topics and/or categories.

ANALYSIS OF DATA

Only descriptive statistics were used to analyze data since the sample was purposely selected. Frequencies, percentage, means and standard deviations were computed .

RESULTS

Mean scores for the research topics ranged from 2.08 to 4.24 ("0" for the lowest priority level and "5" for the highest priority level). The thirty-two additional research topics written in (not on the original instrument) by respondents concerned trends in agricultural education, psychological variables, philosophical issues, historical perspectives, and the relationship of agricultural education to the total secondary curricula and to extension education.

The majority of the research topics (76 out of 109) were rated between 3.00 and 3.99. Differences in mean scores between research experts and department heads were less than .50 for all but eight (8) research topics.

New and emerging skills in biotechnology, high technology, and agribusiness; curriculum for agricultural education; the long-term impact of agricultural education on graduates and the cost/benefit of vocational agriculture were research topics rated highest priority. The lowest priorities were strategies to identify resources for teaching, criteria for tenuring secondary agriculture teachers, and procedures to select students for FFA membership.

A majority of respondents (over 50%) found that (67), or sixty-one percent of the research topics were nationally relevant and forty (40), or thirty-seven percent were state relevant. Several topics in the national and state relevance category were implicitly related to those levels.

Based on a more conservative two-thirds decision rule to categorize research topics as of national, regional, or state relevance; twenty-two (22 out of 109) research topics were nationally relevant. Only five (5) topics were state relevant, and no topic reached the two-third minimum response required for regional level designation. Eighty-two (82) topics did not receive a two-thirds majority in any of the three levels. Table 1 portrays the mean ratings of research topics by respondents and relevance level designations by percentage of respondents.

Of the thirteen conceptual/programmatic research categories , "funding for agricultural education" (M=3.57) was rated highest, followed closely by "evaluation" (M=3.56), and "international agricultural education" (M=3.56). The categories with the lowest mean score were "occupational experience programs" (M=3.16) and "postsecondary education" (M=3.08). Table 2 portrays means scores by respondents for categories of research.

Considering the four regions of AATEA, differences in combined mean scores (research experts and department chairmen) for the research topics were less than 1.0 for all but 17 of the 109 topics.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions were based on the findings from this study:

1. All the research topics (109) were priorities in agricultural education, although the level of priority varied from M=2.08 to M=4.24 (0 = lowest priority; 5= highest priority).
2. Research experts and department heads had similar perceptions of the priority levels for a majority of the research topics.
3. Two-thirds of the respondents agreed that twenty-two (22) research topics should be addressed at the national level and five (5) topics should be investigated at the state level. This implies that researchers can cooperate to focus on topics of national importance. The relevance level of eighty-two topics needs further study and discussion to determine their national, regional and state level relevance .
4. Few differences were found on priority levels for research topics among the four regions of AATEA, which suggests that the profession can identify research priorities nationally.
5. The collective opinions of agricultural education research experts, department heads, state supervisors, secondary teachers, and research experts outside agricultural education who know the profession provided useful perceptions on research priorities for the profession. Categories of concern in agricultural education found by Stewart et al. (1977) were included in priority research areas identified in this study.
6. The conceptual and programmatic research categories for this study provided a useful and comprehensive method to report and discuss the research priorities. Therefore, they may be useful to determine research priorities for the profession in subsequent studies.

7. The procedures for this study provided a systematic means to identify research priorities.
8. Priority research topics for agricultural education identified in this study focused on the improvement of agricultural education in secondary schools. Theoretical constructs, psychological variables, and conceptual bases for agricultural education research were not as apparent as they might have been. Topics written-in by respondents were more theoretically based than topics on the original questionnaire and should be considered in future studies to identify research priorities.
9. The agricultural education profession should take a more pro-active role to identify research needs and priorities. A longitudinal study of research priorities in agricultural education would help move the profession toward programmatic research and document the priorities for funding agencies.

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Table 1

Priority Mean Responses and Relevance Levels for Research Topics.

Research Topics	Priority Levels			Relevance Levels		
	RE (n=34)	DH (n=49)	Comb. (N=83)	N	R	S
	m sd	m sd	M SD	f %	f %	f %
Determine the new and emerging skills needed by students to work in areas such as biotechnology, high technology and agribusiness.	4.21 .88	4.27 .76	4.24 .81	61 74	13 16	9 11
Determine the appropriate curriculum for agricultural education in the secondary schools.	4.00 1.01	4.33 .85	4.19 .97	17 21	10 12	56 68
Determine the long term impact of secondary agriculture programs on graduates.	4.03 .97	4.23 .78	4.15 .87	47 57	13 16	23 28
Determine the cost benefit of vocational agriculture.	4.03 .97	4.22 .80	4.14 .87	46 55	13 16	24 29
Identify the type of agricultural programs needed in urban areas.	3.88 .84	4.16 .80	4.05 .82	26 31	15 18	42 51
Determine the long term benefits of agricultural education.	4.03 .90	4.02 .97	4.02 .94	49 59	13 16	21 25
Determine the long and short term impact/value of SOEP in vocational agriculture.	3.97 1.00	4.00 .98	3.99 .98	41 49	18 22	24 29
Determine strategies to maximize the educational benefits of FFA in agricultural instruction.	3.91 .87	3.95 .99	3.93 .94	59 71	6 7	18 22
Identify strategies to integrate new skills such as biotechnology and high technology to the vocational agriculture curriculum.	3.88 .95	3.95 .96	3.93 .95	47 57	16 19	20 24
Determine which content should be included in local vocational agriculture programs about international agriculture.	3.97 1.17	3.89 1.33	3.92 1.26	51 61	11 13	20 24
Identify instructional materials needs for third world agriculture.	3.94 1.23	3.90 1.21	3.92 1.21	66 81	10 12	3 7
Determine the long term benefits of FFA such as leadership development in local communities.	3.85 1.08	3.92 1.33	3.89 1.23	54 65	9 11	20 24
Determine trends in manpower needs in agriculture such as entrepreneurship opportunities.	3.71 1.17	3.98 1.27	3.87 1.24	39 47	19 23	25 30
Determine the need for urban agricultural education programs.	3.71 1.06	3.98 1.01	3.87 1.03	35 43	12 15	35 43
Determine the effectiveness of four year vocational agriculture programs considering items such as preparation for employment.	3.85 .89	3.86 1.08	3.86 1.00	47 57	8 10	28 34
Identify strategies for cooperative states research.	4.03 .88	3.71 1.47	3.84 1.27	42 51	37 45	3 4
Determine the curriculum development needed to address new and emerging content areas such as urban agriculture programs and programs for the gifted.	3.88 .94	3.74 1.03	3.80 .99	30 36	20 24	33 40

Research Topics	Priority Levels			Relevance Levels		
	RE (n=34)	DH (n=49)	Comb. (N=83)	N	R	S
	m sd	m sd	M SD	f %	f %	f %
Determine the impact of national and state level funding legislation on types and quality of agricultural education.	3.68 1.03	3.77 1.19	3.73 1.12	56 68	9 11	18 22
Identify content to include in preservice teacher education in agriculture.	3.74 1.19	3.69 1.17	3.71 1.17	35 43	17 21	31 37
Identify appropriate use of funding for teacher education in agriculture.	3.47 1.19	3.88 1.16	3.71 1.18	47 57	7 8	29 35
Determine and describe how agricultural education promotes learning.	3.91 1.02	3.53 1.53	3.69 1.24	52 63	8 10	22 27
Determine the role of state level supervision and administration in agricultural education.	3.65 1.20	3.71 1.27	3.69 1.24	27 33	8 10	47 57
Determine the appropriate use of State Departments of Education funding inservice, development and other activities to improve secondary agricultural education.	3.62 1.10	3.71 1.22	3.68 1.17	28 33	8 10	47 57
Identify strategies to measure teacher effectiveness.	3.56 1.10	3.69 1.26	3.64 1.20	44 53	6 7	31 37
Determine curriculum models for urban agricultural education programs.	3.47 1.31	3.76 1.09	3.64 1.19	27 33	15 18	40 49
Determine the immediate educational benefits of FFA activities in secondary agricutural education.	3.65 .98	3.63 1.32	3.64 1.19	58 70	3 4	10 12
Identify models for future teacher education programs.	3.41 1.33	3.76 1.35	3.62a 1.34	58 70	12 15	13 16

Research Topics	Priority Levels			Relevance Levels		
	RE (n=34)	DH (n=49)	Comb. (N=83)	N	R	S
	m sd	m sd	M SD	f %	f %	f %
Identify strategies to determine local program standards.	3.53 1.16	3.65 1.03	3.60 1.08	9 11	6 7	62 82
Identify recruitment strategies for urban agricultural education programs.	3.50 1.24	3.65 1.15	3.59 1.16	25 30	19 23	39 47
Identify programs for new clientele such as urban students and the gifted.	3.75 .85	3.45 1.06	3.59 .99	35 42	17 21	31 37
Determine the effects of supervision on program quality in agricultural education.	3.62 1.04	3.55 1.17	3.58 1.12	38 46	10 12	35 42
Evaluate teaching effectiveness in agricultural education.	3.68 .94	3.45 .96	3.55 .95	30 36	5 6	48 58
What should be the relationship between content in agricultural education and industry/business needs?	3.38 1.26	3.65 1.20	3.54 1.22	44 54	14 17	24 29
Identify strategies to improve prospective teacher recruitment.	3.35 1.07	3.61 1.29	3.51 1.20	44 54	16 20	22 27
Identify characteristics of "successful" teachers in vocational agriculture to guide teacher education programs.	3.53 1.40	3.48 1.34	3.50 1.35	43 52	14 17	26 31
Determine articulation strategies/models for postsecondary and secondary agricultural education.	3.47 1.40	3.51 1.23	3.49 1.29	24 29	8 10	51 61
Determine the short and long term impact of farm business management adults programs in agriculture.	3.27 1.31	3.65 1.19	3.49 1.25	24 29	19 23	39 47

Research Topics	Priority Levels			Relevance Levels		
	RE (n=34)	DH (n=49)	Comb. (N=83)	N	R	S
	m sd	m sd	M SD	f %	f %	f %
Determine the role of supervision and administration in agricultural education at the local level.	3.27 1.16	3.63 1.13	3.48 1.15	9 11	8 10	66 80
Identify new activities for effective use of FFA in agriculture.	3.24 1.26	3.63 1.15	3.47 1.20	51 62	11 13	20 24
Determine turn-over rates for agricultural jobs.	3.50 1.31	3.44 1.44	3.46 1.38	41 49	19 23	23 28
Determine current national standards for high quality in agricultural education.	3.32 1.34	3.53 1.32	3.45 1.33	74 89	1 1	8 10
Determine articulation strategies/models for postsecondary and secondary programs and baccalaureate agricultural instruction.	3.62 1.37	3.31 1.37	3.43 1.37	28 34	15 18	39 47
Identify types/alternatives for SOEP.	3.21 1.17	3.59 1.29	3.43 1.25	24 29	13 16	44 54
Identify strategies for keeping agricultural teachers up-to-date in terms of subject matter.	3.41 1.39	3.43 1.29	3.42 1.32	45 54	13 16	25 30
Identify procedures for maintaining agricultural employment data bases.	3.27 1.31	3.51 1.31	3.41 1.31	48 58	17 21	18 22
Identify alternatives to provide adult agricultural instruction for new areas and audiences.	3.44 1.21	3.36 1.25	3.40 1.23	28 34	11 13	43 52
Identify funding sources for research in agricultural education.	3.61 1.07	3.24 1.44	3.40 1.31	64 78	7 9	11 13
Determine the model and strategies needed to supervise local agriculture instructional programs.	3.21 1.07	3.51 1.14	3.39 1.11	27 33	10 12	46 55

Research Topics	Priority Levels			Relevance Levels		
	RE (n=34)	DH (n=49)	Comb. (N=83)	N	R	S
	m sd	m sd	M SD	f %	f %	f %
What funding patterns and levels are needed for secondary school level?	3.44 .99	3.35 1.42	3.39 1.26	37 45	10 12	36 43
Determine the facility needs for urban agricultural education programs.	3.27 1.08	3.45 1.26	3.37 1.19	16 19	13 16	54 65
Determine skills for development during student teaching.	3.00 1.30	3.63 1.24	3.37 1.30	40 42	12 15	31 37
Determine the role of international agricultural education.	3.50 1.33	3.27 1.57	3.37 1.47	76 92	1 1	5 6
Determine ways to improve the teaching learning environment in agricultural education through teaching techniques such as occupational experiences.	3.53 1.05	3.25 1.19	3.37 1.14	34 42	16 20	32 39
What is the role of leadership and supervision at the national level?	3.35 1.47	3.37 1.36	3.36 1.40	72 87	3 4	7 9
Determine the effectiveness of teacher certification programs.	3.38 1.18	3.31 1.44	3.34 1.34	36 44	18 22	28 34
Identify models to deliver adult education in agriculture.	3.12 1.34	3.46 1.27	3.32 1.30	36 44	14 17	32 39
Determine the short term benefits of agricultural education.	3.27 1.08	3.33 1.05	3.30 1.05	35 42	12 15	36 43
Identify programs appropriate for postsecondary agricultural education.	3.38 1.15	3.18 1.17	3.26 1.16	24 29	17 21	42 51
Determine the most effective methods to evaluate student progress.	3.29 1.19	3.20 1.54	3.24 1.40	43 52	8 10	31 37

Research Topics	Priority Levels RE (n=34)	Priority Levels DM (n=49)	Priority Levels Comb. (N=83)	Relevance Levels N	Relevance Levels R	Relevance Levels S
	m sd	m sd	M SD	f %	f %	f %
Determine minimum SOEP standards.	2.91 1.26	3.55 1.17	3.23 1.24	22 27	10 12	51 61
Identify and explain the variables that relate to student enrollment in agriculture such as, career preference, background, and socioeconomic status.	3.18 1.22	3.35 1.05	3.23 1.12	28 34	14 17	41 49
Identify local strategies for adult agricultural education.	2.85 1.23	3.45 1.24	3.22 1.27	10 12	1 1	71 86
Determine the appropriate use of computers in vocational agriculture programs.	2.97 1.38	3.39 1.25	3.22 1.32	40 48	11 13	32 39
Determine the process for and importance of student cognitive development.	3.44 1.24	3.04 1.29	3.20 1.28	52 63	12 15	19 19
Determine models for instructional content selection for undergraduate teacher education programs.	3.12 1.37	3.27 1.24	3.20 1.29	48 58	13 16	21 26
Develop a professional agenda for types and methods of research needed in agricultural education.	3.18 1.26	3.20 1.53	3.19 1.42	69 85	8 10	4 5
What management systems are needed for local vocational agriculture programs?	3.08 1.08	3.27 1.09	3.19 1.09	26 31	7 8	50 60
Determine and compare different models of certification for vocational agriculture teachers.	3.18 1.14	3.16 1.28	3.17 1.23	47 57	16 19	20 24
Identify funding strategies for adult education in agriculture.	2.88 1.22	3.35 1.28	3.16 1.27	30 37	9 11	43 52

Research Topics	Priority Levels RE (n=34)	Priority Levels DM (n=49)	Priority Levels Comb. (N=83)	Relevance Levels N	Relevance Levels R	Relevance Levels S
	m sd	m sd	M SD	f %	f %	f %
Determine if the image portrayed by the name "FFA" is appropriate.	3.23 1.46	3.06 1.61	3.13 1.54	69 84	3 4	10 12
Determine the relationship between student career choice and curriculum planning in agricultural education.	3.18 .99	3.10 1.26	3.13 1.16	34 41	12 15	37 45
Determine the need for a clearing house for agricultural education research.	3.08 1.16	3.16 1.36	3.13 1.28	74 89	5 6	4 5
Identify strategies to determine the quality of student SOEPs.	3.12 1.17	3.12 1.33	3.12 1.26	30 37	6 7	46 56
Identify trends in state leadership for agricultural instructional programs.	3.15 1.05	3.08 1.38	3.11 1.25	41 49	7 8	35 42
Determine appropriate strategies evaluate adult education in agriculture.	2.91 1.11	3.23 1.12	3.09 1.12	29 35	19 23	34 42
Determine the curriculum development needs for postsecondary agricultural education.	3.06 1.20	3.12 1.24	3.09 1.23	26 32	17 21	38 46
Re-examine the rationale for cooperative activities by federal, state, and local agencies.	3.24 1.26	2.98 1.46	3.09 1.38	60 73	3 4	19 24
Determine models for providing agricultural manpower needs through existing agencies such as The Bureau of Labor and Statistics.	3.09 1.16	3.06 1.46	3.07 1.34	63 76	8 10	12 15
Determine if an adult education program should be a part of the secondary vocational agriculture teacher's job description.	2.91 1.26	3.15 1.60	3.05 1.46	23 29	7 9	50 63

Research Topics	Priority Levels RE (n=34) m sd	 DH (n=49) m sd	 Comb. (N=83) M SD	Relevance Levels N f %	 R f %	 S f %
Identify programmatic thrusts for research in agricultural education.	3.26 .99	2.88 1.52	3.04 1.38	59 74	13 16	8 10
Identify teaching strategies for urban agricultural education programs.	3.15 1.18	2.94 1.31	3.02 1.26	29 35	13 16	41 49
Identify the characteristics of an exemplary SOEP project.	2.82 1.27	3.12 1.11	3.00 1.18	26 31	12 15	45 54
Identify competencies needed by prospective agriculture teachers.	2.76 1.58	3.14 1.62	2.99 1.60	49 59	13 16	21 25
Identify effective laboratory management and safety procedures.	2.73 1.18	3.16 1.26	2.99 1.24	37 45	9 11	37 45
Identify opportunities to participate in international agricultural education.	2.73 1.42	3.14 1.40	2.98 1.41	67 82	7 9	8 10
Identify effective strategies for individualized instruction.	3.30 .98	2.71 1.15	2.95 1.12	35 43	8 10	39 48
Determine the rationale for five-year programs in teacher education.	2.76 1.65	3.04 1.74	2.93 1.70	59 71	11 13	13 16
Determine the admissions' criteria to undergraduate teacher certification programs.	3.06 1.15	2.84 1.49	2.93 1.36	44 53	9 11	30 36
Compare vocational agriculture teacher salaries with other related fields.	3.12 1.59	2.77 1.71	2.92 1.66	40 49	13 16	29 35
Determine models for sequencing competency development for university agricultural education programs.	2.68 1.34	3.04 1.32	2.89 1.33	48 58	12 15	23 28

Research Topics	Priority Levels RE (n=34) m sd	 DH (n=49) m sd	 Comb. (N=83) M SD	Relevance Levels N f %	 R f %	 S f %
Determine strategies for funding postsecondary agricultural education programs.	2.59 1.26	3.10 1.36	2.89 1.33	35 42	6 7	42 51
Identify current funding patterns for agricultural education programs.	2.65 1.07	3.00 1.47	2.85 1.32	44 53	8 10	31 37
Determine the effectiveness of certification procedures.	2.76 1.58	2.84 1.62	2.81 1.59	34 42	14 17	33 41
Determine the purpose of adult education in agriculture.	2.97 1.24	2.69 1.47	2.80 1.38	45 56	11 14	25 31
Determine strategies to identify facility and equipment obsolescence.	2.88 1.06	2.67 1.30	2.76 1.21	19 23	14 17	49 60
Determine the purposes of postsecondary agricultural education.	2.94 1.51	2.63 1.48	2.76 1.50	39 48	15 19	27 33
Determine the types of agricultural students for which SOEP is appropriate.	2.82 1.31	2.59 1.51	2.69 1.43	35 43	9 11	37 46
Identify staffing patterns in university agricultural education.	2.76 1.28	2.61 1.25	2.67 1.26	55 66	11 13	17 21
Determine the effectiveness of census bureau categories in agriculture.	2.41 1.54	2.85 1.54	2.67 1.55	62 75	10 12	11 13
Identify and describe appropriate processes for curriculum planning.	2.48 1.20	2.79 1.49	2.67 1.38	41 49	8 10	34 41
Determine strategies/models for advance credit courses taught at secondary level for postsecondary credit.	2.71 1.22	2.55 1.43	2.61 1.34	20 24	12 15	51 61

Research Topics	Priority Levels RE (n=34)	 DH (n=49)	 Comb. (N=83)	Relevance Levels N	 R	 S
	m sd	m sd	M SD	f %	f %	f %
Determine process for student selection of an SOEP.	2.50 1.05	2.63 1,35	2.56 1.23	25 31	5 6	52 63
Compare reasons for selecting agricultural education among urban and rural students.	2.70 1.22	2.47 1.36	2.56 1.30	25 31	17 21	40 49
Determine the extent to which research should be a priority of the National Council for Agricultural Education.	2.21 1.32	2.80 1.41	2.55 1.40	78 95	0 0	4 5
Determine the reasons why teachers leave the profession.	2.53 1.28	2.55 1.59	2.54 1.47	38 46	14 17	30 37
Identify effective university promotion/tenure criteria for agricultural education.	2.41 1.28	2.59 1.63	2.52 1.49	57 69	5 6	21 25
Determine strategies to identify resources for teaching.	2.35 1.01	2.55 1.41	2.47 1.26	19 23	9 11	55 66
Determine criteria for tenuring secondary agriculture teachers.	2.12 1.39	2.29 1.67	2.22 1.55	31 38	8 10	42 52
What students are appropriate for FFA membership?	2.09 1.26	2.08 1.48	2.08 1.38	50 65	3 4	24 31

Notes: DH = Department Heads
RE = Research Experts
N = National
R = Regional
S = State

Table 3

Priority Levels for Research Topics by Conceptual/Programmatic Categories.

Categories	RH	DH	Total
	m	m	M
Funding for Agricultural Education.	3.46	3.65	3.57
Evaluation.	3.56	3.56	3.56
International Agricultural Education.	3.54	3.55	3.55
Urban Programs.	3.38	3.49	3.44
Curriculum and Instructional Development.	3.41	3.40	3.40
Future Farmers of America.	3.33	3.38	3.36
Supervision and Administration.	3.32	3.39	3.36
Manpower Needs.	3.23	3.42	3.34
Teacher Education/Certification	3.17	3.28	3.24
Adult Education.	3.04	3.29	3.19
Research in Agricultural Education.	3.23	3.16	3.19
Occupational Experience Programs.	3.05	3.23	3.16
Postsecondary Education.	3.11	3.06	3.08

Note:
Scale = "0" lowest priority, "5" highest priority.

Research Priorities in Agricultural Education in the United States
A Critique

George Wardlow, University of Minnesota -- Discussant

Among the studies conducted in agricultural education, it is refreshing to find research topics which are timely and hold broad-based appeal to the entire profession. This topic is one of great importance. The authors should be commended for their decision to pursue this important problem. The following remarks are based on the copy of the paper provided for this reviewer prior to the conference.

This study sought to determine research priorities in agricultural education through the perceptions of selected researchers and head teacher educators in the profession. The study was based upon a professionally accepted concern and was supported by appropriate related studies from the literature. The objectives were clearly enumerated and were developed from a clearly defined statement of purpose.

The study includes mean scores to indicate the relative importance of each of over 100 research topics in agricultural education. This data is, in itself, of great importance to the profession.

Several concerns arise as one reads the article. At points the article lacks clarity. The reader is forced to make leaps in understanding what the authors intend to explain. An example is the "specified research categories" from objective one. A paragraph of definitions of terms would clarify many points.

Several objectives were inconsistent with the research procedures used and the findings reported. In reading research one expects to find a natural link between each of the objectives in the Objectives section and appropriate methodology in the Procedures section. This should be followed by findings related to each objective in the Findings section and subsequently, related conclusions in the Conclusions section. Such was not the case here. Objectives three and five each indicated that "differences" between groups would be investigated. However, neither the Procedures section nor the Analysis section offered any methodology to determine if statistical significance of any differences was the goal of these questions. Further, the Results section offered little discussion of objectives three and five. The Conclusions and Recommendations section does report results related to these objectives.

A conceptual consideration centers around the choice of methodology employed to conduct the research. The paper reports that the instrument was prepared from the literature and a review panel. If the purpose of the study was, as stated in objective one, to "identify research priorities," that is to have the profession identify the research agenda, it is difficult to rationalize how providing a predetermined agenda (the instrument) to which experts within the profession can only rate items, can accomplish the purpose of the study. The use of a researcher prepared instrument on which subjects indicate a level of importance might not be the optimum procedure for securing the information desired. For studies such as this, researcher prepared instruments, however well validated and reliable, include only items deemed important to those involved in the development and may or may not represent truth. The fact that 32 items in addition to the original 109 were added by the respondents is evidence of this concern. Further, no evidence is provided as to whether the respondents were allowed to rate these 32 items, which may more nearly represent "truth," when they rated the original 109. The selection process for the review panel used in instrument preparation was not explained.

If the purpose of the study was only to determine the relative importance of items from a specified list, the procedures used were correct. However, the development of an instrument which is logically valid should preceed any rating question. For research questions such as this, other procedures which provide the opportunity for subjects to develop the items, such as various forms of the delphi procedure, may be more appropriate.

In summary, the reseachers have contributed to the corpus of knowledge in agricultural education research. They should be commended for their professional contribution and urged to puruse this area further.

SAFETY EDUCATION AND PRACTICES IN AGRICULTURAL MECHANICS LABORATORIES: AN ASSET OR LIABILITY

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INTRODUCTION

Few, if any agricultural educators will question the need to provide a safe working environment in agricultural mechanics laboratories. Likewise, they would also emphasize the need for teaching students both formally and by example the importance of safety and the means by which one provides a safe working environment. Williams[1] supports this concept when he says,

> "The school shop, as a work place, provides the environment for the development of safety concepts and safe habits which will guide the actions of the individual through out his work life." He goes on to say, "We can teach occupational accident prevention only by strenuously making it an integral part of the way a student works. . . "

Bies[2] also stresses the need for safety education in schools when he says,

> "Safety, therefore, cannot be taken for granted or considered secondary in the education of students, for the future of their lives will depend upon their ability to develop safe work habits and become aware of the working environment."

As mechanization in the United States has increased and as new technologies continue to emerge, one sees increased emphasis placed upon safety in business and industry. This is evidenced by the many safety education programs conducted, the increased emphasis placed upon safety, expanded accident prevention programs, and by the recording of many types of safety statistics. The passage of the Occupational Safety and Health Act of 1970 (OSHA) is additional evidence of the high premium society places upon safety. This act required employers to provide a safe place of employment which is free of hazards. Due to the increased emphasis placed upon all aspects of safety and the investment of substantial monetary and human resources, industry had been able to achieve a remarkable decrease in fatal and serious work injuries. However, it is important to note and remember that accidents are caused by environmental conditions and/or human behavior. Bies[2] states,

> "It is, therefore, necessary that every teacher, shop foreman, and student safety engineer be aware of those conditions and behaviors that contribute to work injuries. Attention should be given to the shop environment and students' behavior to develop effective instruction in work procedures. . ."

Safety education and enforcement with students is also a legal obligation in todays' society. Kigin[3] supports this when he says,

> "The possibility of a public school teacher being involved in a legal action resulting from a school-related injury is greater today than in any period of educational history. The problem is real! It

must be faced directly and intelligently if teachers are to be protected from the financial burden and the ignominy of being a defendant in a court trial." He goes on to say, "The possibility of accidents. . .is considerable because of the nature of the activities which are a normal part of the learning process."

Connors[4] says,

> "The very nature of education exposes its employees to higher than average tort hazards. These hazards can easily result in pupil injuries and, consequently, in lawsuits."

With the many educational, legal, and regulatory aspects of safety and safety education, one could easily believe that safety education and enforcement is widely and diligently practiced. However, according to Mr. David Harcum, Underwriter for the Ohio School Board Association, School Insurance Program, the number of lawsuits being brought against vocational educators is increasing yearly. He also says that the number of deaths caused by school accidents remains relatively constant, causing 5-7 deaths per year in Ohio. Thus, one wonders if safety education and the providing of a safe teaching environment is viewed as being as necessary and important as other instructional areas in the vocational agriculture curriculum, or is it in actuality neglected and only taught out of necessity? Expert witness testimony[5] would tend to suggest that safety is not widely taught, emphasized, nor practiced:

> "The primary individual who was directly and clearly responsible for the hazardous setup and resulting accident was the regular Vo-Ag Instructor.
>
> In this case it is clear that the students were not only allowed but expected and instructed to work in unsafe conditions. Since the school board is ultimately responsible for the safety and protection of students from accidental injury, I find that all are guilty of irresponsible action and gross negligence which did in fact constitute the proximate cause of the very unfortunate disabling injuries suffered by the student. Furthermore, I find absolutely no reason to indicate that the student was in any way responsible for the accident. The total blame and liability must be directly placed upon the teacher, the school administration, and the board of education."

The above testimony, as well as other expert witness testimony, coupled with the increasing number of cases involving safety litigation should certainly raise questions as to the adequacy of safety education and the safety practices being followed in high school vocational agriculture programs. This study was conducted to assess compliance with accepted safety practices in high school vocational agriculture programs and to identify those areas where teachers, administrators, and school boards may be held liable in the case of a student accident resulting in injury to the student.

PURPOSE AND OBJECTIVES

This study investigated the extent to which programs of production vocational agriculture complied with accepted safety practices in agricultural mechanics laboratories. The following research questions were investigated:

1. Are high school programs of production vocational agriculture complying with accepted safety practices in agricultural mechanics laboratories in the following major areas:

    a. Walking - Working Surfaces
    b. Means of Egress
    c. Fire Protection
    d. Medical and First Aid
    e. Personal Protective Equipment
    f. Tools
    g. Welding, Cutting, and Brazing
    h. Electrical
    i. Compressed Air Equipment
    j. Environmental Control

2. In what areas of safety could high school teachers of production vocational agriculture, administrators, and school boards be held liable in the event of a student accident resulting in injury?
3. In what areas of safety is inservice education needed to help high school teachers of production vocational agriculture become more aware of the safety practices expected.

PROCEDURES

This study utilized a previously developed survey instrument to measure compliance or non-compliance on 120 different safety practices grouped within ten major safety areas. The safety practices were identified from Occupational Safety and Health Act (OSHA) requirements that would impact upon high school agricultural mechanics laboratories and other safety requirements that had been identified by a panel of agricultural mechanics teacher educators. Reliability was established using Cronbach's Alpha. The reliability of individual sections of the instrument ranged from 0.59 to 0.82.

Teachers were asked to complete the survey form either individually or with the assistance of students enrolled in the program. The survey form consisted of 120 safety practice items that were to be reported as to being in compliance (C), not in compliance (NC) or not applicable (NA). The data was coded using a nominal scale of 0=NC, 1=C, and 2=NA. Not all items had the option of not applicable (NA). For example, all schools might not nave a radial arm saw but all schools should have fire extinguishers.

The survey instrument, along with a letter explaining the survey and why it was being conducted, was sent to a random sample of 50% of the high school production agriculture departments in Ohio (N=182). Three mailings were conducted with follow-up letters sent after each mailing. One hundred forty-five (145) surveys were returned which equals a 79% response rate. Early respondents were compared to late respondents with no significant differences found.

ANALYSIS OF DATA

All data were coded and appropriate statistical procedures were used for the reporting of frequencies and Chi square analyses. The SPSS/PC+ microcomputer program was used for data entry and analysis.

RESULTS

Table 1 shows a summary of the schools that were in compliance on all safety practice items within the major safety areas. It should be noted that there were no schools in compliance in all safety areas. The frequency of compliance in individual safety areas ranged from a low of 1% of the schools on personal protective equipment to a high of 56% of the schools in the compressed air equipment safety area. Chi square analyses showed a significant difference in all safety areas.

TABLE 1
Summary of Schools Reporting 100 Percent Safety Compliance
Within Major Safety Areas
n=145

SAFETY AREA	Compliance		Chisquare
	%	Number	
Walking-Working Surfaces	4	96	133*
Means of Egress	15	85	104*
Fire Protection	4	96	133*
Medical and First Aid	18	82	97*
Personal Protective Equipment	3	97	136*
Tools	1	99	142*
Welding, Cutting, Brazing	24	76	83*
Electrical	19	81	95*
Compressed Air Equipment	48	52	45*
Environmental Control	25	75	81*

*chisquare $\leq$ .001 = 10.8

Table 2 shows the safety compliance on individual safety practice items within major safety areas. It should be noted that only 49 (41%) of the safety practice items were in compliance out of a total of 120 items.

TABLE 2
Safety Compliance on Individual Safety Practices Within
Major Safety Areas

		% Compliance	% Non Compliance	X^2	% NA
I.	Walking - Working Surfaces				
1.	Laboratory appearance neat and orderly. 1910.22(a)*	78	22	6.72	--
2.	Aisles properly indicated. 1910.22(b)	44	56	27.45	–
3.	Aisles, passageways, and corridors free of obstructions. 1910.37(g) (4)	81	19	91.20	--
4.	Floors free of obstructions. 1910.37(g) (4)	75	25	9.06	–
5.	Floors maintained in a clean and dry condition. 1910.22(a) (2)	90	10	1.37*	--
6.	An absorbent material available for grease and oil spills on floors.	74	26	9.64	--
7.	Non-skid surfaces provided at stationary tools on smooth floors.	24	76	83.44	--
8.	Safety lanes provided around stationary tools.	45	55	42.54	--
9.	Walls and storage areas clear of objects that might fall.	83	17	4.02	--
10.	Stored wood and metal stacked safely and solidly. 1910.22	84	16	3.69*	--
11.	Scrap wood and metal stored neatly in proper bins.	78	22	7.06	
12.	Fixed stairs provided to overhead storage room(s). 1910.24(b)	30	12	4.81	58
13.	Stairways having more than 4 risers have a standard hand railing 30 in. - 34 in. high. 1910.23(e) (2)	23	8	2.75*	69

	% Compliance	% Non Compliance	X^2	% NA
14. Every opening, floor, or platform 4 ft. or more above ground level has a standard guard rail 42 in. high with an intermediate rail and a toe board of at least 4 in. above the floor. Rail must withstand 200# thrust. 1910.23(a) (3)	28	18	10.24	54
15. Fixed ladders meet design specifications. Rung to back clearance 7 in., maximum rung spacing -12 in., caged if more than 20 ft. to a maximum of 30 ft. 1910.27(b)	27	6	1.36*	67
16. Portable ladders in good repair. 1910.25(b)	40	10	2.72*	50
17. Portable ladders not exposed to elements, heat or dampness.	46	4	0.05*	50
18. Portable ladders hung or stored horizontally.	28	19	10.88	53
II. Means of Egress				
1. Laboratory has at least two exits.	96	4	4.08	--
2. Exit signs visible and directional exit signs provided if necessary. 1910.37	63	37	20.11	--
3. Exit signs have letters 6 in. high, 3/4 in. strip.	57	43	26.22	--
4. Exit signs have 5 candle power illumination.	49	51	37.26	--
5. Non-exit doors clearly identified "NOT AN EXIT" or otherwise labeled for use. 1910.37	34	66	63.18	--
6. Exit doors and access to exits not locked from exit side. 1910.37	85	15	3.04*	--
7. Emergency lighting for exits provided and operational.	38	62	55.16	--
III. Fire Protection				
1. Fire alarm provided. 1910.36	83	17	4.00	--
2. Fire extinguisher locations properly marked. 1910.157	85	15	3.04*	--
3. Maximum distance to fire extinguisher 75 ft. 1910.157(c) (2)	93	7	0.69*	--
4. Fire extinguishers of proper type	94	6	0.45*	--
5. Fire extinguishers tested yearly. 1910.57	94	6	0.44*	--
6. Maximum height of fire extinguishers from floor to extinguisher top is 5 ft., if over 40#, 3 1/2 ft. 1910.157	92	8	0.43*	--
7. Fire blanket(s) readily available. 1910.44	28	72	73.67	--
8. "NO SMOKING" signs posted in the laboratory.	20	80	5.84	--
9. Safety cans used for flammable or combustible liquids. 1910.106	74	26	9.50	--
10. Combustible wastes kept in covered metal containers and disposed of daily. 1910.106(d) (3)	62	38	20.39	--
11. Fire resistant cabinet used to store flammable liquids. 1910.106(d) (3)	49	51	36.50	--
12. Cleaning solvent has flash point of not less than 100°F. 1910.107(g) (5)	82	18	4.66	--
IV. Medical and First Aid				
1. Emergency telephone numbers posted in the laboratory.	37	63	56.57	--
2. Evacuation procedures posted in the laboratory.	73	27	10.56	--
3. Certified person(s) available to render first aid. 1910.151(b)	75	25	8.57	--
4. First aid supplies approved by consulting physician. 1910.151(b)	55	45	28.35	--
5. First aid supplies readily available.	79	21	6.25	--
V. Personal Protective Equipment				
1. Safety test(s) administered to each student before access to the laboratory is granted.	92	8	0.83*	--
2. Copy of safety test retained on file.	85	15	3.06*	--
3. Industrial quality eye protection required to be worn. 1910.133(a) (1)	94	6	0.44*	--
4. Industrial quality eye protection provided. 1910.133(a) (1)	82	18	4.66	--
5. Industrial quality protection properly stored.	74	26	10.02	--
6. Emergency shower easily accessible. 1910.151	15	85	104.08	--
7. Emergency shower functional.	17	83	95.55	--
8. Respirators provided for areas contaminated with harmful dusts, fogs, fumes, mists, gasses, smokes, sprays, or vapors. 1910.34[illegible]	40	60	49.90	--

*These reference numbers are keyed to the General Industrial Safety and Health Regulations, Part 1910, U.S. Department of Labor, November, 1978. OSHA 2206.

	% Compliance	% Non Compliance	X^2	% NA
9. Face shields provided at each stationary power tool. 1910.133	55	45	29.13	--
10. Bump hats or hard hats provided in areas where impact or falling objects hazards exist. 1910.135	34	66	64.06	--
11. Leather gloves required for hot metal and rough work.	87	13	2.25*	--
VI. Tools				
1. Informational safety rules posted near each stationary power tool.	37	63	57.50	--
2. Stationary power tools anchored to the floor. 1910.212 (b)	56	44	27.75	--
3. Each power driven tool provided with a positive "Lockout System" to render the machine inoperative. 1910.213(a) (10)	45	55	43.60	--
4. Electrical control switches on stationary power tools within easy reach of operator. 1910.213(b)	92	8	0.84*	--
5. Stationary power tools equipped with magnetic starters. 1910.213(b) (3)	60	40	22.08	--
6. Stationary power and non-powered tools color coded. 1910.144	29	71	73.16	--
7. Stationary tools arranged so that individuals are protected from hazards of other machines.	86	14	2.77*	--
8. Table saw equipped with a hood, guard, non-kickback fingers or dogs, and spreader. 1910.213(h)	74	14	3.14*	12
9. Radial arm saw equipped with hood, guard, non-kickback fingers or dogs, rotation sign, automatic return, and table extension or stop. 1910.213(h)	58	25	10.19	17
10. Radial arm saw equipped with danger sign affixed to the rear of the guard at the approximate level of the arbor, not less than 1 1/2" x 3/4", reading as follows: "DANGER, DO NOT RIP OR PLOUGH FROM THIS END." The label should be colored standard danger red. 1910.213(h) (5)	36	46	37.23	18
11. Radial arm and table saws equipped with roller units or stands to assist in moving material to the saw and removal after cutting.	[illegible]	45	36.11	19
12. Radial arm saw, table saw, and jointer equipped with push sticks or blocks.	75	15	3.75*	10
13. Band saw has an adjustable guard above the blade rolls and the blade wheels are covered. 1910.218(i)	71	6	0.58*	24
14. Jointer has an automatic guard covering all sections of the cutting head. 1910.213(j)	63	6	0.82*	31
15. Planer cutting heads covered by a metal guard. 1910.213(n) (1)	45	1	0.06*	54
16. Planer feed rolls guarded by a hod or suitable guard to prevent the operators hands from contacting the in-running feed rolls. 1910.213(n) (3)	44	2	0.09*	54
17. Tools kept sharp, clean, and in good working order. 1910.213(n) (1)	89	11	1.76*	--
18. Hand-held circular saws equipped with a pressure switch that cannot be locked in the ON position and will shut power off when pressure is released. 1910.242 (1) (2) (1)	84	16	3.73*	--
19. Portable power tools securely stored.	94	6	0.06*	--
20. Tools and equipment properly stored when not in use.	92	8	0.99*	--
21. Grinder has guards to cover the spindle ends, nuts, and flanges. 1910.215(a)	87	10	1.59*	3
22. Grinder work rests height adjusted top center of arbor. 1910.215(a) (2)	86	12	2.28*	2
23. Grinder rests adjusted within 1/8 in. of the grinding wheel. 1910.215(a) (4)	79	18	4.79	3
24. Grinder tongue guard or spark deflector adjusted within 1/4 in of the grinding wheel. 1910.215(b) (9).	74	21	6.96	5
25. Maximum periphery exposure for stationary grinder 65 degrees. (Exposed distance between tool rest and tongue guard or spark deflector). 1910.215(b) (3)	77	17	4.33	6
26. Portable grinders and saws have proper shielding in position. (180 degrees maximum explosure). 1910.243	70	17	4.64	13
27. Grinders, polishers, and buffers are equipped with an adequate exhaust system. 1910.94(b) (4)	34	43	34.13	23
VII. Welding, Cutting, and Brazing				
1. Arc welder cables, electrode holders, and ground clamps in good state of repair. 1910.94(b) (4)	90	8	1.01*	2
2. Electrode holders hung up, and so placed and fastened securely to the cable so they do not make electrical contract. 1910.252(b) (4)	92	7	0.70*	1
3. Welding area floor dry and free of combustible materials. 1910.252(b) (4)	95	4	0.25*	1
4. Fire resistant curtains or shields used around arc welding areas or booths. 1910.252(b) (4)	79	18	4.83	3
5. Arc welding helmets and welding goggles with tampered safety glass of proper shade and hardened cover lens in good condition. 1910.252(b) (4)	92	7	0.70*	1

		% Compliance	% Non Compliance	X^2	% NA
6.	Adequate ventilation provided for he dissipation of exhaust gases and welding fumes. 1910.252(f) 1910.93	73	26	9.64	1
7.	Forge or furnace adequately vented. 1910.94	19	3	0.52*	79
8.	Oxyacetylene manifold welding systems installed according to the N.F.P.A.** 1910.252(a) (2) (iv)	31	19	10.88	50
9.	Protective caps in place on all cylinders designed to accept a cap except when cylinders are connected for use. 1910.252(a) (ii)	84	6	0.62*	10
10.	Fuel gas cylinders and oxygen cylinders separated by at least 20 ft. or a 4 ft. high wall of 1/2 hr. heat barrier. 1910.252	34	30	19.06	36
11.	Portable gas welding equipment cylinder valves turned off when not in use. 1910.252(7)	90	4	0.18*	6
12.	Soap suds cup and brush available and used to test for gas leaks after disrupting any connection.	63	31	14.34	6
13.	Compressed gas cylinders chained or secured in an upright position. 1910.252	90	4	0.26*	6
14.	Friction lighter available and used to light welding or cutting flame or pilot light.	92	6	0.46*	2
VIII.	Electrical				
1.	Electrical cabinets and power room accessible only to authorized personnel. 1910.309 N.E.C.***	59	41	23.85	--
2.	Electrical receptacles, junction boxes, and switch boxes properly covered. 1910.309 N.E.C.	90	19	1.38*	--
3.	Electrical outlets and fixtures properly grounded. 1910.309 N.E.C.	94	6	0.57*	--
4.	Stationary power tools and equipment properly grounded. 1910.213(a) (11)	94	6	0.45*	--
5.	Ground fault circuit interrupter (G.F.C.I.) available for outdoor use.	44	56	43.75	--
6.	Extension cords and [portable power tools properly grounded or double insulated. Cords of 3 wire grounding type. 1910.213(a) (11)	85	15	2.81*	--
7.	Electrical disconnects identified. (Circuit breakers, fuse boxes, etc.). 1910.213 N.E.C.	79	21	6.42	--
8.	Signal units for heating, ventilating, and air conditioning are operational. 1910.309 N.E.C.	71	29	11.26	--
9.	Overcurrent devices on all electrical loads. 1910.309 N.E.C.	87	13	2.34*	--
10.	Restroom facilities equipped with G.F.C.I. receptacles.	18	18	12.05	64
IX.	Compressed Air Equipment				
1.	Pressure gauge in air line. 1910.169(b) (3)	76	10	1.60*	14
2.	Safety valve in air line in good working order and tested frequently. 1910.169(b) (3)	61	24	9.63	15
3.	Air used for cleaning regulated to not more than 30 psi and chip guarded. 1910.169(b) (3)	39	30	18.86	31
4.	Air compressor drained frequently. 1910.169(b) (2)	72	18	5.28	10
X.	Environmental Control				
1.	Total laboratory ventilation proper and adequate. 1910.94	60	40	22.56	--
2.	Illumination adequate in the power tool area. (50-75 ft. candles). 1910.219(c) (5)	88	12	2.02*	--
3.	Laboratory lighting safe, sufficient, and well-placed.	83	17	4.00	--
4.	Laboratory noise level within established limit. (90dB 8 hrs: 105dB 1 hr.). 1910.95(a)	83	17	4.17	--
5.	Battery charging area has facilities for flushing and neutralizing electrolyte. 1910.178 1910.151(c)	7	15	15.12	78
6.	Washing and clean-up facilities properly maintained.	87	13	2.28*	--
7.	Brooms, bench brushes, dust pans, and other equipment necessary for clean-up properly stored.	91	9	1.18*	--
8.	Safety hooks used on all chains and lifting devices. 1910.179(h)	35	21	11.25	44
9.	Rated load plainly marked on the side of lifting equipment. 1910.179(h)	41	14	5.12	45
10.	Safety stands available for mechanics use.	70	30	12.27	--
11.	Fans and flywheels within 7 ft. of the floor are guarded with a guard having holes not greater than 1/2 in. in width. 1910.213(h)	84	16	3.97	--
12.	Gears, moving belts, chains and shafts, etc., protected by permanent guards. 1910.212(a) (3)	89	11	1.58*	--

* Chi square ≤ .05

**National Fire Protection Association

***National Electrical Code

CONCLUSIONS AND RECOMMENDATIONS

This study supports the statements made by the expert witness concerning safety violations, negligence, and liability of vocational agriculture teachers, school administrators, and boards of education. Accepted safety practices are not being practiced in high school agricultural mechanics laboratories. The following conclusions are given based upon the results of this study:

1. Teachers of vocational agriculture are not following accepted safety practices in agricultural mechanics laboratories.
2. Teachers of vocational agriculture, school administrators, and boards of education are extremely vulnerable to being found negligent and subsequently liable if a student accident leads to student injury.
3. Inservice education needs to be provided to allow teachers the opportunity to learn what is expected of them in all safety areas pertaining to agricultural mechanics laboratories.
4. Additional emphasis needs to be placed upon safety in the pre-service agricultural education curriculum.
5. Additional research is recommended to answer the following questions:
    a. If teachers of vocational agriculture are aware of the safety practices expected of them, why do they not follow these safety practices in the agricultural mechanics laboratory?
    b. Do school administrators and boards of education endorse and help implement expected safety practices in the agricultural mechanics laboratory?
    c. What descriptive data is needed regarding school accidents so as to help in developing an effective, efficient safety education program.

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Safety Education and Practices in Agricultural Mechanics Laboratories: An Asset or Liability
A Critique

Jack L. Rudolph, Jr., University of Wyoming--Discussant

The researchers build an extremely strong case for their study during the introduction. As they indicate in their opening sentence:

> Few if any agricultural educators will question the need to provide a safe working environment in agricultural mechanics laboratories.

This case is built most convincingly with the exerpts from testimony concerning vocational agriculture teacher negligence, as well as administration and school board negligence:

> The primary individual who was directly and clearly responsible for the hazardous setup and resulting accident was the regular vo-ag instructor.

The first objective of the study was clear and followed the instrument.

1. Are high school programs in vocational agriculture complying with accepted safety practices.

The second objective inquires into what areas of safety the teacher, administrators, and school boards should be held liable.

2. In what areas of safety could high school teachers of production vocational agriculture, administrators, and school boards be held liable in the event of a student accident resulting in injury?

I am not sure this objective could be totally met by this or any other study. In today's society liability appears to be endless.

The third objective is looking into the need for teacher inservice safety education.

3. In what areas of safety is inservice education needed to help high school teachers of production vocational agriculture become more aware of the expected safety practices.

The study does not directly state the areas of need but from the results, one can conclude that no area should be overlooked. The data collected for this study relies very heavily on the honesty and candor of each instructor and this could be perceived as a weakness. The analysis of the data was clear and understandable. The results of this study are frightening and I would imagine very applicable to anywhere in the country.

I applaud the researchers for this most needed and helpful study.

STUDENT MISBEHAVIOR IN VOCATIONAL AGRICULTURE AND OTHER VOCATIONAL PROGRAMS: A COMPARISON

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INTRODUCTION

In the 20 years that the Gallup Poll on the Public's Attitudes Toward the Public Schools has been conducted, "lack of discipline" has been regarded as the number one problem facing the public schools in sixteen of the polls. In the last three polls (Gallup, 1986, 1987, 1988) "use of drugs" has been at the top of the list with lack of discipline ranking second. The only year where drugs or discipline was not the number one problem was in 1971 when "lack of proper financial support" was cited. Clearly, use of drugs and lack of discipline are regarded by the public as major problems facing education today.

Vocational educators are concerned with discipline. There have been numerous articles in vocational education journals about student discipline. The cover of the March 1988 issue of School Shop shows a hand and paddle with the caption "Beyond the Paddle: Getting Students to Behave." A recent article in the Business Education Forum (Sanders and Sanders, 1986) was "Developing and Implementing an Effective Classroom Discipline Plan for Secondary Business Education Teachers." The Home Economics Education Association has published Positive Approaches to Classroom Discipline (Martin & Quilling, 1981). The March 1985 theme for The Agricultural Education Magazine was "Innovative Student Management Strategies." The articles concerning discipline in these and other vocational education publications typically are the "conventional wisdom" type of articles on how to have good discipline. Rarely are the articles based on documented research.

There has been little research on the "actual" discipline problems experienced by vocational teachers or how to attack the problems. A nationwide survey of over 400 vocational agriculture teachers conducted by Camp and Garrison (1983) in which the most serious discipline problems experienced by vocational agriculture teachers were identified was the only empirical research on documenting actual discipline problems in vocational education found by the researchers.

A study on how to attack discipline problems was conducted by Legacy (1982) in Illinois. A group of high school vocational agriculture teachers, administrators, high school vocational students, and student teachers reacted to case studies and made recommendations as to how the sample discipline problems should be handled.

Since discipline is perceived by the public as a problem, and vocational education journals regularly publish articles on how to handle discipline situations and some research on teacher turnover indicates student conduct contributes to the decision to leave teaching (Moore and Camp, 1979), it does appear that research in this area is warranted. If the discipline problems vocational teachers have can be identified, then it might be possible to design and validate specific strategies for attacking these problems.

PURPOSE AND OBJECTIVES

This research study was designed to answer four questions:

1. What student misbehaviors are perceived as being problems by agriculture teachers in Louisiana?
2. Do Louisiana agriculture teachers have the same type and degree of misbehavior problems as other vocational teachers in Louisiana?
3. Do agriculture teachers in Louisiana have different problems than agriculture teachers nationally?
4. Is discipline and drug use perceived to be a serious problem in vocational agriculture and in other vocational disciplines in Louisiana?

PROCEDURES

The 2,720 secondary vocational teachers in Louisiana in the spring of 1986 were the population for the study. According to Krejcie and Morgan (1970), a sample size of 341 (assuming a 5 percent error rate with a 95 percent confidence level) would be needed. However, the researchers wanted to be able to isolate each vocational discipline for analysis. A proportionate random sample of 341 would not result in enough people in a specific vocational area for independent analysis. Therefore, each vocational discipline was considered to be the population in determining the sample size to draw. This would provide for the appropriate sample size while looking at one specific discipline but would result in a larger than needed sample size when two or more vocational disciplines were combined and examined. Seven different random samples were drawn (one from each vocational area) and resulted in a sample size of 1,205.

The research was supported by the LSU College of Agriculture's Small Grants Program and the funds were extremely limited. Funds were available for only one mailing of the instrument which was done in the spring of 1986. A total of 470 teachers responded (39%) but only 448 were usable. The response rate for each vocational discipline was Health Occupations - 66%, Agriculture - 54%, Home Economics - 44%, Business Education - 40%, Marketing Education - 38%, Trade and Industrial Education - 34%, and Industrial Arts - 21%. The low response rates should be kept in mind when looking at results since some disciplines are under represented in the sample and all disciplines have substantially large nonresponse groups.

The Student Misbehavior Survey developed by Camp was used to identify misbehavior problems. The instrument has been developed and refined over a decade and has been successfully used in several studies. The instrument lists 86 misbehaviors including drugs, crimes, and typical discipline problems. The teachers rate each item on a five point scale as to the seriousness of the item. In this research effort the instrument yielded a Cronbach's Alpha reliability coefficient of .98.

Data from the Camp and Garrison study were obtained for the purpose of comparing the Louisiana results with the national sample of vocational agriculture teachers used by Camp and Garrison.

ANALYSIS OF DATA

In the data analysis, the first procedure was to partition the data into two subsets--agriculture teachers and other vocational teachers. Mean scores for each of the 86 misbehavior items were calculated. Next, all the data were combined and factor analysis was conducted to determine the underlying misbehavior factors. Three factors emerged from this. After the underlying factors were isolated , the data were again segregated into two groups and mean factor scores were calculated for each of the factor categories and teacher groups. Three t-tests were used to determine if their were differences between the two teacher groups on the three misbehavior factors. Spearman rank correlation coefficients were calculated for the behavior rankings of the various groups of teachers.

RESULTS

The most serious student misbehavior problem encountered by agriculture teachers in Louisiana had to do with ambivalence (doesn't care attitude). Ambivalence was followed by negative attitude toward school, making a mess, failing to bring materials to class, talking without permission, and not following instructions. The most bothersome misbehaviors identified by agriculture teachers in Louisiana were typically attitude related. Even though these items were the highest rated, the mean rating score was around 2.0 which is a "moderate" problem. There were no "major" or "critical" problems. A list of all the behaviors as rated by the teachers is presented in Table 1.

The least serious student misbehavior problems encountered by agriculture teachers in Louisiana had to do with criminal activities such as rape and homicides and student activism such as strikes and political protests.

In general, the problems experienced by Louisiana vocational agriculture teachers were not different from the problems experienced by other vocational teachers in Louisiana or from the national sample of vocational agriculture teachers. All three groups ranked ambivalence first followed closely by other general student attitude items such as negative attitude toward school, talking without permission, etc. The criminal activity items were ranked similarly low by all three groups. Spearman Rank order correlation coefficients were calculated for the rankings of problems by Louisiana vocational agriculture teachers and Louisiana vocational teachers and the national sample of agriculture teachers from Camp and Garrison. The correlation for Louisiana vocational agriculture teachers and Louisiana vocational teachers was .95 which was statistically significant at the .05 level. Problems as perceived by the Louisiana vocational agriculture teachers and the national sample of vocational agriculture teachers had a Spearman correlation of .97 which was also statistically significant at the .05 level. Perceptions of student misbehavior problems were similar for Louisiana vocational agriculture teachers, Louisiana vocational teachers and the national sample of agriculture teachers.

The misbehaviors loaded into three factors when a factor analysis was conducted. A loading of .34 or greater was considered to be sufficient to indicate that a variable was loaded on a given factor. Factor 1 had 38 items and was termed Student Attitude. Items such as ambivalence, talking without permission, negative attitude, is messy, etc. loaded on this factor. Of the 30 misbehavior problems that were rated the highest by the vocational agriculture teachers, 20 of the items loaded on Factor 1. Factor 2 had 36 items and was label Social Deviance. Items that tended to be criminal in nature or drug related loaded on this factor. Of the 30 lowest rated misbehaviors, 27 loaded on Factor 2. Factor 3 had 12 items and was identified as Attendance Related. Most of the items in Factor 3 were concerned with tardiness and missed classes. Table 1 contains a list of all the misbehavior items along with the factor category into which each item loaded. It was noted that Camp and Garrison's national study also factored into three categories. The first factor was identical-Student Attitudes. In the Camp and Garrison study, Factor II was Violence Related and Factor III was Use of Drugs. In the current study Violence and Drugs loaded together and a third factor emerged-Attendance. Since Louisiana generally leads the nation in the school dropout rate, it was not surprising to see this factor emerge.

After the factor analysis, mean factor scores for each of the three factors for the Louisiana vocational agriculture teachers and Louisiana vocational teachers were calculated. Three t-tests were computed to see if there were differences between agriculture teachers and other vocational teachers in Louisiana on the three factors. These results are presented in Table 2. There were no statistically significant differences between the two groups of teachers on the three factors. Factor 1 (Student Attitude) and Factor 3 (Attendance) had rating scores of from 1.41 to 1.67 which indicates the problems were perceived as being between "minor problem" to "moderate problem". The Social Deviance score (Factor 2) was the lowest for both groups (.72 and .64) and was classified between "not a problem" and "minor problem."

Items related to drug use were generally rated low. The highest rated drug problem identified by agriculture teachers was "smoking/chewing tobacco" which was ranked 11th with a 1.69 rating. The next closest drug related item was "use of alcohol (at school)" which was ranked 47th with a mean rating of 1.20.

CONCLUSIONS AND/OR RECOMMENDATIONS

Typically, the perceived problems encountered by Louisiana agricultural teachers related to indifference on the part of the student and typical juvenile behavior. Students were inattentive, didn't hand in assignments, goofed around, and had a negative attitude toward school. There was nothing really surprising in the problems identified by the teachers. The mean scores of the highest rated misbehaviors were around 2.0 which is classified in the middle of the rating scale as moderate. They were no major or critical problems. The misbehavior problems encountered by vocational agriculture teachers and other vocational teachers were not very serious.

Contrary to the perceptions of the public in the latest three Gallup Polls, drug use was not perceived to be a major problem in vocational agriculture or vocational education. Most items related to drugs were rated at 1 (minor problem) and lower.

The misbehaviors identified by agriculture teachers in Louisiana were similar to the misbehaviors identified by other vocational teachers in Louisiana. Plans and procedures developed to combat the most bothersome problems should be applicable to all vocational teachers.

Agriculture teachers in Louisiana had similar problems to the nationwide sample of agriculture teachers surveyed by Camp and Garrison. Techniques developed to handle general student misbehavior problems for vocational agriculture teachers in Louisiana would apparently be useful in other states also.

The researchers recommend that students in undergraduate vocational teacher training programs be made aware of the types of problems they can expect to encounter in teaching. If teachers are aware that the problems they will encounter in regards to student attitudes are universal, then they may not have such strong feelings of self doubt while teaching. It might be desirable to stage the more common misbehaviors such as talking without permission, inattentiveness, clowning, etc. during microteaching sessions so prospective teachers could encounter the problems and react to them before student teaching.

There is a need to emphasize more strongly student motivation procedures in vocational teacher training programs. If high school students are ambivalent about their education, teachers will need to work extra hard to motivate students to learn and to also teach in an attention commanding manner.

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Table 1

Misbehavior Items, Factor Loadings, Mean Ratings, and Mean Rankings of Student Misbehaviors as Perceived by Vocational Agriculture Teachers and Vocational Teachers in Louisiana and Vocational Agriculture Teachers From the Camp and Garrison National Vocational Agriculture Teacher Study

Misbehavior	Factor Loaded On^a	LA Vo. Ag. Teacher Ranking & Mean Score^b N=75		Other LA Vo. Teacher Ranking & Mean Score N=373		National Vo. Ag. Ranking & Mean Score N=437	
Ambivalence (doesn't care attitude)	1	1	2.01	1	2.38	1	2.13
Negative attitude toward school	1	2	1.97	2	2.35	3	1.93
Making and leaving a mess	1	3	1.97	11	1.90	6	1.73
Failing to bring books, paper, pencil, etc.	3	4	1.96	4	2.30	2	2.04
Talking without permission	1	5	1.89	6	2.04	4	1.85
Not following instructions	1	6	1.89	3	2.31	5	1.77
Clowning/foolish behavior	1	7	1.89	8	1.98	7	1.66
Lying (to teacher, other)	1	8	1.76	17	1.71	23	1.28
Absenteeism (unexcused truancy)	3	9	1.69	10	1.94	18	1.37
Blaming others (not assuming responsibility)	1	10	1.69	14	1.81	12	1.49
Smoking/chewing tobacco	3	11	1.69	34	1.40	9	1.54
Profanity/abusive language	1	12	1.64	24	1.61	11	1.53
Cheating in class	1	13	1.61	16	1.72	26	1.25
Failing to do in-class assignments	1	14	1.60	13	1.81	8	1.55
Disrespectful to other students	1	15	1.60	22	1.63	13	1.48
Vandalism to school property	2	16	1.59	29	1.52	17	1.40
Noise making (laughing, coughing, etc.)	1	17	1.57	21	1.63	27	1.25
Tardiness to class	3	18	1.56	12	1.83	19	1.36
Name calling	1	19	1.55	37	1.33	25	1.25
Inattentiveness (daydreaming, etc.)	1	20	1.53	9	1.95	15	1.45
Teasing	1	21	1.52	31	1.45	20	1.35
Getting out of seat without permission	1	22	1.52	30	1.51	34	1.17
Interfering with work of others	1	23	1.51	19	1.71	10	1.53
Failing to turn in homework	3	24	1.51	7	1.99	14	1.46
Absenteeism (excused but excessive)	3	25	1.51	5	2.12	16	1.44
Abusing privileges (hall, bathroom, etc.)	1	26	1.51	26	1.57	28	1.30
Disrespectful toward authorities	1	27	1.51	20	1.68	22	1.31
Tardiness to school	3	28	1.48	15	1.79	24	1.27
Cheating outside class	3	29	1.44	23	1.62	32	1.18
Vocal outbursts	1	30	1.41	28	1.52	35	1.13
Theft (minor)	2	31	1.37	32	1.45	21	1.31
Turning in assignments late	3	32	1.29	25	1.58	31	1.18
Arrogance/antagonism	1	33	1.29	27	1.53	29	1.20
Throwing objects (paper wads, rocks, etc.)	1	34	1.28	49	1.05	38	1.09
Skipping class	3	35	1.25	36	1.34	37	1.09
Hyperactivity (abnormal activity)	1	36	1.23	45	1.10	43	.99

Table 1 continues

Table 1 (continued)

Misbehavior	Factor Loaded On[a]	LA Vo. Ag. Teacher Ranking & Mean Score[b] N=75		Other LA Vo. Teacher Ranking & Mean Score N=373		National Vo. Ag. Ranking & Mean Score N=437	
Eating/drinking in class (candy, soda, etc.)	1	37	1.23	18	1.71	41	1.05
Passive evasion (hiding, delaying, etc.)	1	38	1.20	43	1.17	30	1.19
Vandalism to community property	2	39	1.19	44	1.15	40	1.06
Defiance (openly refusing to comply)	1	40	1.17	35	1.35	42	1.03
Running in the halls	1	41	1.16	38	1.26	46	.96
Destroying own or other's property	1	42	1.16	42	1.17	39	1.07
Obscene notes/writing/graffiti	1	43	1.12	46	1.07	57	.67
Slovenly manner/appearance	1	44	1.20	40	1.23	44	.96
Making obscene gestures	2	45	1.20	52	.99	49	.91
Threatening other students	2	46	1.20	58	.91	53	.74
Use of alcohol (at school)	2	47	1.20	50	1.00	48	.92
Reading non-class materials in class	1	48	1.09	33	1.42	36	1.10
Sulking	1	49	1.08	51	.99	47	.95
Violations of dress code	3	50	1.08	41	1.18	68	.40
Squirming, fidgeting	1	51	1.07	36	1.33	33	1.17
Leaving campus	3	52	1.07	55	.93	51	.79
Verbal confrontations with authorities	1	53	1.01	39	1.25	45	.96
Use of drugs before school (not marijuana)	2	54	1.01	47	1.05	52	.75
Hitting/fighting with other students	2	55	.99	54	.95	50	.89
Use of alcohol (before school)	2	56	.99	56	.93	58	.63
Smoking marijuana (before school)	2	57	.99	57	.92	54	.74
Sleeping in class	1	58	.92	48	1.05	59	.61
Unauthorized persons on campus	2	59	.92	60	.88	63	.50
Theft (major)	2	60	.89	59	.90	55	.70
Entering prohibited areas	2	61	.80	63	.80	60	.53
Use of drugs other than marijuana at school	2	62	.80	67	.68	64	.49
Smoking marijuana (at school)	2	63	.80	61	.86	56	.69
Heterosexual activity	2	64	.79	64	.74	62	.52
Tattling	1	65	.75	62	.81	61	.52
Ethnic or racial disturbances	2	66	.73	65	.69	72	.32
Slipping out of class (after start)	2	67	.73	73	.48	67	.41
Selling drugs	2	68	.72	72	.52	71	.36
Note passing	1	69	.69	53	.98	65	.44
Bring dangerous weapons to school	2	70	.68	68	.60	73	.30
Group misbehavior (crowds, mobs, etc.)	2	71	.67	66	.69	66	.43
Stealing exams or tests	2	72	.64	70	.54	75	.25
Gambling (cards, penny-tossing, etc.)	2	73	.55	75	.35	69	.39
Injuring others (intentional)	2	74	.55	71	.52	70	.37
Threatening school employees	2	75	.53	69	.59	76	.23
Bringing pornographic materials to school	2	76	.52	77	.33	74	.26
Socially delinquent behavior (exposure)	2	77	.48	74	.40	77	.23
Striking school employees	2	78	.41	76	.35	78	.13

Table 1 continues

Table 1 (continued)

Misbehavior	Factor Loaded On[a]	LA Vo. Ag. Teacher Ranking & Mean Score[b] N=75		Other LA Vo. Teacher Ranking & Mean Score N=373		National Vo. Ag. Ranking & Mean Score N=437	
Masturbation	2	79	.39	85	.13	82	.08
Homicides (attempted or actual)	2	80	.36	78	.24	84	.06
Homosexual activity	2	81	.32	79	.20	81	.08
Protests, political	2	82	.30	82	.16	80	.09
Picketing or strikes by students	2	83	.29	83	.14	83	.07
Rape (attempted or actual)	2	84	.28	86	.13	86	.05
Injuring self (intentional)	2	85	.27	80	.19	79	.09
Student political activism	2	86	.17	81	.16	85	.05

[a] Factor 1=Student Attitude, Factor 2=Social Deviance, and Factor 3=Attendance

[b] 0=Not a problem, 1=Minor problem, 2=Moderate problem, 3=Major problem, 4=Critical problem

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Table 2

Misbehavior Factor Scores of Agriculture Teachers and Other Vocational Teachers in Louisiana

Factor	Vo. Ag. Teachers N=75	Other Voc. Teachers N=373	t value	Significance Level
1. Student Attitude	1.41	1.53	1.20	.23
2. Social Deviance	.72	.64	.79	.43
3. Attendance	1.46	1.67	1.91	.06

0=Not a problem, 1=Minor problem, 2=Moderate problem, 3=Major problem, 4=Critical problem

Student Misbehavior in Vocational Agriculture and Other Vocational Programs: A Comparison
A Critique

J. Dale Oliver, Virginia Tech--Discussant

Lack of discipline continues to be perceived as a major problem for public education. The researchers have clearly documented this in their framework for the study. The purpose and objectives of the study were clearly stated. The authors are to be commended for using a sound instrument in the study and for factor analyzing the results to determine the underlying constructs to use in further analysis.

My primary concern about the study was the low response rate from the teachers. Due to lack of funds, the researchers were unable to address the area of nonresponse error and this is a serious limitation of the study. The sample size could have been reduced if only two groups had been sampled (agriculture teachers and other vocational teachers) and this is all that would have been needed to meet the objectives of the study. The resulting savings could have been used to follow-up nonrespondents. The paper would be improved by providing more information on the factor analysis that was conducted (type of correlation matrix used, how initial factors were extracted, and rotational method used to arrive at the terminal solution). Such information would be needed if one wished to replicate the study. It would also be helpful to include the reason for sampling each vocational area as a separate population.

I am pleased that the researchers have attempted to expand our knowledge about student misbehavior to the total vocational education program. I feel they have offered useful recommendations for dealing with the problems encountered by teachers.

TEACHING CRITICAL THINKING AS PERCEIVED BY IOWA VOCATIONAL AGRICULTURE INSTRUCTORS

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Teaching critical thinking is not new to the agricultural education discipline. It has, however, been placed on the back burner in recent years. What has rekindled renewed interest in this concept is not important. The fact that agriculture educators have focused attention on the need to develop this skill and offered guidelines for inducing critical thinking is important. Research in this area is growing. Individuals in the agriculture education discipline generally agree that emphasis on teaching critical thinking must be pushed to the forefront of instructional emphasis in the vocational agriculture curriculum. Crunkilton stated that (3, p. 2):

> The act of education is the most serious responsibility that a society must accept, if indeed that society desires to exist in the future. A society must not only decide what values or beliefs are worthy of passing on to the future generation, but it also must decide what skills are needed by the future generation to carry on those values or beliefs.

Since the agricultural industry is becoming increasingly technical, teaching critical thinking will grow in significance in agricultural education.

Other educators have offered opinions on the subject of critical thinking. Richard Paul (11) believed that if teachers incorporated critical thinking in the classroom, it would help students ask questions that call for analysis, synthesis, and evaluation. He added that the "Taxonomy" and the ability to generate a full variety of question types is all that an intelligent teacher needs to teach critical thinking skills. He urged teachers to take a well-designed course in critical thinking so that they can effectively understand, teach, and explain to students the need to be able to think critically. Stephen P. Norris (10) also argued that critical thinking is an indispensible part of education because the ability to think critically is a necessary part of being well educated. In the same fashion, W. H. Lancelot (6) believed that students must be kept thinking in order for good teaching to result. He argued that where thinking is lacking, learning cannot take place. According to Lancelot, students are capable of finding solutions to everyday problems, but they must be taught how to think critically in order to solve problems. Arthur Costa (1, 2) conceded that thinking is important and that students can think. As a result of his belief, Costa suggested that it is important that educators create an environment whereby students can participate wholesomely in the area of thinking. He suggested that educators need to realize that students can think and should capitalize on this realization by creating classroom conditions that coerce students to think critically.

It is clear that there is a need for agricultural educators to teach critical thinking. Mastering these skills will help both the student and the teacher. The purpose of this study was to determine Iowa secondary vocational agriculture teachers' attitudes toward teaching students to think critically and their perceptions of using critical thinking techniques in vocational agriculture.

The specific objectives of this study were to: (1) determine teachers' attitudes toward teaching critical thinking; (2) identify the kind of evaluation methods used in evaluating students in vocational agricultural classes; and (3) identify the kinds of teaching methods employed in the classroom setting that enhances a student's ability to think analytically, objectively, and critically.

METHOD OF PROCEDURE

The design of the study was descriptive. A random number program designed for microcomputers (Apple IIe) was used to select 90 vocational agricultural instructors from the State of Iowa as listed in the 1986-87 National Directory of Vocational Agriculture Departments for the study. In addition, 40 additional agricultural instructors were selected from the population as substitute respondents in the event that some of the first 90 respondents did not return their questionnaires. The population was oversampled to save time and avoid any delay that would be involved in selecting substitutes for nonrespondents after the data collection had begun (8).

A list of critical thinking items was developed based on information provided by Costa (1, 2) and Ennis (4, 5). This list was divided into three sections: learning activity items, teaching-process items, and achievement assessment items and was reviewed and critiqued by graduate students, agricultural education faculty members and specialists in educational methodology. Their suggestions were used to make additions and subtractions from the list of items. The items were put in questionnaire format and mailed to the 130 randomly selected Iowa vocational agricultural instructors. Respondents were instructed to complete the survey and return it in an enclosed, self-addressed, stamped enveloped that was provided. All questionnaires returned were complete and used as returned in the study. A follow-up letter including the original cover letter and questionnaire was mailed to the nonrespondents. Data collection was concluded on April 23, 1987, with a response rate of the desired 90 responses (66 of the original sample and 24 of the substitutes).

A reliability test of the instrument items using Cronbach's procedure resulted in an overall alpha level of .93 and a standardized alpha of .93 for teaching items, .90 for achievement assessment items, and .96 for learning activity items.

In order to measure whether critical thinking was being taught in Iowa vocational agriculture classrooms, a scale was developed for use by these educators to examine critical thinking activities. A scale ranging from 1 to 99 was selected for use in this study. A "1" value indicated "no importance," a scale value of "50" indicated "some importance," and a scale value of "99" represented "utmost importance."

A scale of this type is more appropriate because, according to Lemon (7), a larger number of divisions, in a scale, produce unsatisfactory distribution of responses, while fewer divisions irritated respondents because of a lack of sufficient selection.

Wolins and Dickinson (12) concluded that an increase in the relationship between reliability and the number of scale categories could be created by transforming scale values to normal deviates. The desirable effects of these transformations were summarized by Menne when he stated (9, p. 25):

> This transformation weighs highly the responses at the end of the scale and gives relatively low weights to those responses in the center of the scale. This transformation has further effect of decreasing the correlation between item means and variances. It is well known that with short scales, the item means and variances are curvilinearly related. This transformation results in a substantially smaller relationship between these two statistics.

Because of the conclusions reached by Menne, Wolins and Dickinson, a response scale of 1 to 99 was selected for use in this study. Scale values were converted to normal deviates with a 1 being converted to -2.33, 50 to 0.0 and 99 to 2.33. These converted scores were multiplied by 100, and 500 added to establish values that eliminated decimals and negative numbers. A new scale was created by converting scale values to normal deviates. The new scale consisted of a low value of "267" in place of "1", "500" to "50", and "733" in place of "99".

The statistical procedures used for data analysis in this study included means, frequencies, and standard deviations. Factor analysis of the data was useful to reflect the relationship between study items and descriptive factors.

FINDINGS

The following statements summarize the major findings of this investigation:

1. Vocational agriculture instructors generally believed that emphasizing critical thinking was important but may not have the time to teach critical thinking in their classes (Tables 1, 2, and 3).

2. The four most important student-learning activities were: learning to make decisions, solving problems, applying facts and principles, and interpreting factual information. The four least important student-learning activities were: thinking aloud, identifying unstated assumptions, looking for assumptions, and determining the strength of an argument (Table 1).

3. The four most important achievement assessment activities according to the vocational agricultural teachers in Iowa were: giving written examinations, completing statements, answering essay questions, and participating in classroom discussion (lecture, etc.).

4. The three least important activities in achievement assessment expressed

by vocational agriculture teachers in Iowa were: guessing at answers, giving oral examinations, writing papers to observe writing style and giving unannounced quizzes (Table 2).

5. The items that most influenced vocational agriculture teachers in the teaching-process activity were methods of teaching be varied and that teachers be facilitators or guides to learning (Table 3).

CONCLUSIONS/RECOMMENDATIONS

It is evident from the study that teaching critical thinking is important in vocational agriculture programs. If students are going to be taught to think critically, the curriculum must have critical thinking as one of its primary objectives. Thus, it is necessary for vocational agriculture instructors to be taught critical thinking techniques before they begin teaching students to think critically. Programs that concentrate on problem solving, decision making, creative thinking, and higher-order skills are essential.

The following suggestions should be considered in educating vocational agriculture teachers to teach critical thinking:

1. Participation in inservice workshops and short courses on how to teach critical thinking technique should be required of all teachers in agriculture education. This training would develop vocational agriculture teachers' skills in using thinking skills in the classroom environment.

2. Vocational agriculture programs need to refocus their teaching more toward critical thinking, problem solving, and decision making.

3. Emphasis should be placed on developing vocational programs that would incorporate learning activities intended to have students learn to think about thinking.

4. Iowa's educators should emphasize the teaching of critical thinking as a skill which would revitalize interest in students to study agriculture.

It is important that critical thinking be stressed to encourage students to think critically, objectively, and analytically in order to handle real-life situations and problems. Changes in the Iowa vocational agriculture program, whether through increased emphasis on critical thinking, special workshops, seminars, inservice workshops, short courses, or preferably a combination of all of these, could result in an increased awareness and emphasis on critical thinking in Iowa vocational agriculture programs. In order to develop critical thinking, programs must be instituted to assist teachers in meeting these needs of students.

Table 1. Partial list of means, standard deviations, and mean rankings of the importance of specific student-learning activities

Learning activity	Mean	Standard deviation	Mean rank among activity means
	N=90		
As part of your teaching strategy, how important is it that students:			
Learn to make decisions	656.32	62.01	1
Solve problems	636.21	62.30	2
Apply facts and principles	612.60	66.64	3
Distinguish relevant from irrelevant information claims or reasons	577.42	59.34	17
Determine the reliability of a claim or source	576.63	54.39	18
Recognize the adequacy of data	575.43	62.05	19
Look for assumptions	557.33	66.84	32
Identify unstated assumptions	553.45	54.19	33
Think aloud	535.45	67.50	34
Overall mean	580.94	39.89	

Table 2. Means, standard deviations, and mean rankings for student achievement assessment activities

Achievement assessment activity	Mean	Standard deviation	Mean rank among activity means
	N=90		
To what degree do you use the following criteria in making your assessment:			
Guessing at answers	431.55	85.42	15
Choose different choices of answers	531.44	73.38	9
Discern between right and wrong statements	559.05	82.75	8
Match terms and concepts	576.52	68.34	5
Complete statements	586.20	69.98	2
Answer short answer essay questions	583.94	67.17	3
Enumerate	525.78	71.29	10
Write papers to observe writing style	505.85	68.79	13
Participate in class discussion (lecture, etc.)	577.17	81.62	4
Grade notebooks	532.54	111.23	11
Announce quizzes	568.24	73.51	7
Give unannounced quizzes	513.29	83.89	12
Grade students' homework assignments	572.94	86.34	6
Give oral examinations	495.80	108.92	14
Give written examinations	626.22	69.63	1
Overall mean	546.24	48.83	

Table 3. Partial table of means, standard deviations, and mean rankings for teaching-process activities

Teaching-process activity	Mean	Standard deviation	Mean rank among activity means
	N=90		
When teaching vocational agriculture classes, how important is it that:			
Methods of teaching be varied	638.18	69.75	1
The teacher be a facilitator or guide to learning	615.76	64.42	2
Students be challenged through questioning	612.50	54.20	3
Students be provided with course objectives as to what will take place during a class period	585.70	76.05	14
Learning activities be planned that will allow students to discover answers to given problems	583.87	52.27	15
Students apply what they have learned in other disciplines to the area of agricultural education	583.08	66.96	16
Students memorize factual information	537.42	74.13	26
The learning process focus only on the type and amount of subject matter students should learn	524.21	68.54	27
Students be permitted to help in establishing course objectives	520.68	67.39	28

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Teaching Critical Thinking as Perceived by Iowa Vocational Agriculture Instructors
A Critique

Ray V. Herren, The University of Georgia - Discussant

This study sought to determine the perceptions of Iowa Vocational Agriculture Teachers regarding the teaching of students to think critically. The researchers were thorough in laying out the importance of critical thinking in the education of students and providing the theoretical framework for the study. The objectives of the study were clearly presented and the study design was properly developed to achieve the objectives. Generally accepted procedures of survey research were followed. Attention was given to developing an instrument that was reliable and valid.

Although I have no real concern for the validity of the data collected, I have a few suggestions for the study.

1. What is the practical difference between selecting a sample of 90 and then an additional 40 respondents, and a sample of 130 with a return rate of 69%? If the samples in both cases were randomly selected, the results should be the same. Also, it would have been helpful to have known the total number in the population.

2. I'm still not clear as to why a scale of 1-99 was used. I find it difficult to believe that there could be 99 different degrees in the perceptions of the teachers. It would seem that a simpler scale of five or seven would have obtained the same results with fewer steps and would be easier to interpret. For example, a value of 3.5 on a 5 point scale would be easier to put into perspective than a value of 656.32 in a scale of 267 to 733.

3. In finding number one, I suggest that the phrase about teachers not having enough time to teach critical thinking be moved to the conclusion/recommendations section. This section would be more appropriate since the time factor appears to be speculation. Also finding number five should be reworded to indicate perceptions and not influence. Table 3 indicates that the teachers were asked for their perceptions as to the importance of the items not the influence of the items.

These suggestions are not aimed at diminishing the validity of the study, but are offered as suggestions to strengthen the reporting of the study and to aid in a replication. Most of my suggestions could be categorized as personal preference.

THE IMPACT OF AN EXPERIENCED-BASED SCHOOL ENRICHMENT PROGRAM IN PLANT SCIENCE ON THIRD GRADE STUDENTS' SELF-ESTEEM

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INTRODUCTION

Young people today are often labeled as "information rich and action poor". Those involved with educating today's youth, formally or informally, are reminded that their sole function is no longer simply relaying information to their students, but rather, preparing a student for a useful life in society (Sinks and Hess, 1969; Hauenstein, 1972).

Too often, time is spent demonstrating ideas, concepts, or skills and preventing the learners from performing them. Instead, Berman and Roderick (1977) suggest that educators should view education as a process in which the learner is an active participant and not a passive recipient. Learning is minimal where involvement is minimal. By involvement, educators should be concerned with how and to what degree an individual engages in an interaction with persons, materials, or ideas.

PROBLEM STATEMENT

The concept of experiential education has evolved to the forefront in many aspects of curriculum and instruction recently. Conrad and Hedin's work in the late 70's is one example of the effort to document the value of experiential education as supporting the total youth development aim of education. Several studies have evaluated the effectiveness of experienced-based education to the overall psychological, social, and intellectual development of youth (Kraft and Keilsmeier, 1986).

The experienced-based project method has been and remains an important tool for the 4-H method of teaching and learning. While 4-H was founded as experienced-based subject matter programs and has evolved to programs with a broader focus on the development of young people, little "hard" evidence supporting the impact on youth beyond subject matter exists. Very few empirical studies have focused on testing these underlying assumptions about the broader hypothesized developmental benefits. Rather, much of our emphasis has been targeted at knowledge transfer and skill development related to specific subject matter.

The needs of young people today are much more complex and not limited to specific knowledge and skill in subject matter areas. However, 4-H curricula developers continue to advocate the use of subject matter, and the experiences it presents, as a means for broader youth development. Especially, 4-H curriculum delivered as a school enrichment program needs to be evaluated to demonstrate the degree to which it contributes to the broader life skills of youth in addition to the subject matter knowledge and skills.

PURPOSE AND HYPOTHESES

In 1986, a curriculum evaluation project was designed to investigate the impact of the experienced-based project delivered by 4-H on the psychological and social, as well as intellectual development of young people. The curriculum in this evaluation study focused on a new first year experienced-based project unit, entitled Meet the Plants, that had been developed and proposed for for use in 4-H clubs and school enrichment programs in 1985.

The purpose of this paper is to evaluate the impact of an experienced-based 4-H school enrichment program on third grade students' self esteem. Specifically, the objective was to determine if participation in a 4-H school enrichment program using the plant science project, Meet the Plants, would affect third grade students' self-esteem, a measurable life skill.

The null hypotheses stated:

(1) These are no significant differences in posttest self-esteem scores of students in treatment groups as compared to control groups.

(2) There are no significant differences in self-esteem scores between students in rural counties as compared to students in urban counties on posttest scores.

RESEARCH DESIGN AND PROCESS

Experimental Design

The research design suitable for use in this study was the nonequivalent control group design (Campbell and Stanley, 1963). While random assignment of individuals to treatment levels is a characteristic of true experimental designs, it was neither practical nor suitable for this study. As a consequence, the nonequivalent control group design was selected. Attention was given to selecting similar control and treatment groups from the pool of available classes for this study.

The independent variable was the participation in a school enrichment program which exposes pupils to Meet the Plants, a 4-H plant science project. The dependent variable was pupils' performance on the Culture-Free Self-Esteen Inventory for Children. A major modifying variable was the location of the county: rural or urban.

Sample

The Curriculum Development Committee working with the evaluation project selected 21 counties in Pennsylvania for the sampling frame from which the sample counties were selected. Krejcie and Morgan (1970) determined that the needed sized of a randomly chosen sample from a population of 21 such that the sample proportion would be within +/- .05 of the population proportion with a 95 percent level of confidence should be 19(p.607-610). Due to the complexity of the evaluation project which included both financial constraints and time limitations, a sample including 19 counties was neither possible nor practical. Instead, a random sample of 8 counties designed to be approximately representative of Pennsylvania within the context of the expressed needs of the development committee was selected.

During the 1986-87 school year Extension Youth Agents in each of the 8 counties selected for the study were asked to voluntarily participate. Four youth agents from Allegheny, Blair, Tioga and Forest Counties agreed to participate in the study. Two third grade classes from each county were voluntarily solicited to participate with random assignments made as either treatment of control groups. Of the four counties, Forest County did not follow through with adequate data. Therefore, six third grade classes, three for control and three for treatment, participated. The third grade sample consisted of 108 third grade boys and girls. Fifty-seven subjects comprised with the treatment group; 51 subjects comprised the control group. Thirty-six subjects were from rural counties; 68 subjects were from urban counties.

Instrumentation

The self-esteem level of the subjects was measured by Battle's Culture-Free Self-Esteem Inventory (SEI) (Battle, 1981). The Culture-Free SEI for children consists of 60 yes/no questions and provide an easy to administer measure of childrens' self worth. It consists of five subscales: general self-esteem, social/peer-related self-esteem, academic/school-related self-esteem; parental/home-related self-esteem and a lie scale that indicates defensiveness and serves as an internal valitity check. This test was used to measure changes in self-esteem in the groups studied. The vocabulary level in the test is suitable for third grade pupils and up.

Battle reported test-retest reliability coefficients ranging from 0.81, for third graders, to 0.89, for sixth graders. A Pearson Product Moment correlation was used to establish test-retest reliability for the sample in this study. The test-retest reliabilities were lower than those reported by Battle. Total reliability coefficients for third grade was 0.63.

The instrument was administered to all third grade pupils during the pretest and again upon completion of the experiment. Teachers responsible for the experimental groups were instructed to administer the posttest to their classes during the week immediately following their completion of the Meet the Plants project. Teachers responsible for the control group were instructed to administer the three posttests during the eighth week after the pretest.

Experimental Treatment

At the completion of the pretest, teachers responsible for the treatment groups began the 4-H school enrichment program using the Meet the Plants project. The teachers were asked to complete the project within a six to eight week period. During this period the agents maintained lines of communication with the teachers and were available should advice or support be requested.

Assumption

1. It is assumed that the school sample selected is approximately representative of schools participating the 4-H school enrichment programs in the four extension regions of Pennsylvania.

Limitations

1. The sampling frame of 21 counties selected by the development committee was purposive with eight random counties being selected for participation. However, participation was limited to only those which participated on a voluntary basis. Therefore, no attempt is made to generalize findings beyond the participants in the study.

2. The classes participating in this program may be taught by teachers specializing in any of various disciplines. There was no control over whether the program is taught by any particular type of teacher. Just as Extension programs are offered upon the request of the clientele, this evaluation was offered only to volunteers.

3. The results of the experiment were limited to the changes in measured characteristics with occurred during the length of the experimental framework.

FINDINGS

Pretest and posttest means (Table 1) for total self-esteem ranged from intermediate to high, according to Battle's (1981) classification for elementary students.

Table 1. Summary of Self-Esteem Pretest and Posttest Scores of Third Graders by Treatment and Control Groups.

		Pretest			Posttest		
Self-Esteem Scale	Group	N	Mean	SD	N	Mean	SD
Total Self-Esteem[a]	Treatment	57	37.16	6.42	55	41.56	5.78
	Control	51	36.90	5.92	49	36.86	7.56
General Self-Esteem[b]	Treatment	57	14.58	2.77	55	16.51	2.51
	Control	51	14.54	3.02	49	14.45	3.30
Social Self-Esteem[c]	Treatment	57	6.26	1.94	55	7.51	1.98
	Control	51	6.67	1.84	49	6.82	1.86
Academic Self-Esteem[c]	Treatment	57	7.93	2.44	55	8.58	1.75
	Control	51	7.58	1.97	49	7.33	2.30
Parental Self-Esteem[c]	Treatment	57	8.39	1.68	55	8.96	1.04
	Control	51	8.41	1.34	49	8.27	1.59

[a] Total Self-Esteem scores range from a low of 0 to a high of 50.
[b] General self-Esteem scores ranged from a low os 0 to a high of 20.
[c] Social, Academic, Parental Self-Esteem scores could ranged from a low of 0 to a high of 10.

Preliminary tests, using independent t, determined equivalence of control and treatment group scores on the pretest. Pretest scores were not significantly different before participating in the 4-H school enrichment experience. However, when urban and rural groups were compared on their pretest values, urban classes had higher total, general and academic self-esteem than the rural counterparts (p<.001) before the experiment (Table 2). No statistical differences were found between rural and urban students pretest scores for social and parental self-esteem.

Table 2. Independent T-Test of Third Grade Pretest Self-Esteem Inventory Scores for Rural and Urban Residential Areas.

Group	n	Mean	SD	t	p
Total Self-Esteem[a]					
Rural	36	34.08	5.77	-3.73	0.00
Urban	72	38.51	5.85		
General Self-Esteem[b]					
Rural	36	12.89	2.98	-4.18	0.00
Urban	72	15.18	2.52		
Social Self-Esteem[c]					
Rural	36	6.11	2.03	-1.33	0.19
Urban	72	6.63	1.81		
Academic Self-Esteem[c]					
Rural	36	6.86	1.93	-3.71	0.00
Urban	72	8.22	1.73		
Parental Self-Esteem[c]					
Rural	36	8.22	1.47	-0.85	0.40
Urban	72	8.49	1.55		

[a] Total Self-Esteem scores ranged from a low of 0 to a high of 50.
[b] General self-Esteem scores ranged from a low of 0 to a high of 20.
[c] Social, Academic, Parental Self-Esteem scores ranged from a low of 0 to a high of 10.

To answer the null hypotheses of the study, an independent t was calculated on posttest scores for total self-esteem and the four self-esteem subscales. Posttest results showed self-esteem values for treatment groups were significantly higher than control group values for total (p=.001), general (p=.001), academic (p<.01) and parental (p<.05) self-esteem (Table 3). The 4-H school enrichment did promote a change in self-esteem.

Posttest values for social self-esteem did not differ significantly between treatment and control group.

Table 3. Independent T-Test of Third Grade Posttest Self-Esteem Inventory Scores for Experimental Groups.

Group	n	X	SD	t	p
Total Self-Esteem[a]					
Treatment	55	41.56	5.784	-3.54	0.001
Control	49	36.86	7.56		
General Self-Esteem[b]					
Treatment	55	16.51	2.51	-3.55	0.001
Control	49	14.45	3.30		
Social Self-Esteem[c]					
Treatment	55	7.51	1.98	-1.83	0.070
Control	49	6.82	1.86		
Academic Self-Esteem[c]					
Treatment	55	8.58	1.75	-3.16	0.002
Control	49	7.33	2.30		
Parental Self-Esteem[c]					
Treatment	55	8.96	1.04	-2.68	0.011
Control	49	8.27	1.59		

[a] Total Self-Esteem scores ranged from a low of 0 to a high of 50.

[b] General self-Esteem scores ranged from a low os 0 to a high of 20.

[c] Social, Academic, Parental Self-Esteem scores ranged from a low of 0 to a high of 10.

For the groups which were significantly different, two-way analysis of variance (ANOVA) and analysis of convariance (ANCOVA) calculations were performed to determine what amount of the change was due to treatment and whether the treatment affected the rural and urban groups differently. For total self-esteem, ANCOVA was used to assess group differences by residential area and experimental group. Both null hypotheses were rejected, meaning significant differences existed for treatment group and residential area. As shown in Table 6, treatment groups scored significantly higher on total self-esteem that control groups (F=20.10; df=1/104; p<.001) on the posttest. Urban classes scored significantly higher than rural classes (F=4.01; df=1\104; p<.048).

Table 6. Two-Way Analysis of Convariance to Assess Group Differences on the Total Self-Esteem Scores for Third Grade Classes by Residential Area and Experimental Group After Adjusting for the Pretest Scores.

Scorce	df	SS	MS	F	p
Convariate (pretest self-esteem scores)	1	1426.45	1426.45	56.46	0.00
Treatment by Control	1	507.67	507.67	20.10	0.00
Rural by Urban	1	101.36	101.36	4.01	0.05
Experimental group by Residential area	1	16.42	16.42	0.65	0.42
Constant	1	551.97	551.97	21.85	0.00
Error	99	2501.07	25.26		

For general self-esteem, ANCOVA was used to discern group differences by residential area and experimental group. Treatment groups scored significantly higher than control groups in general self-esteem (F=18.45; df=1/104; p<.001). Thus the first null hypothesis was rejected. However, the second null hypothesis was not rejected because the rural and urban groups were not significantly different, (F=0.32; df=1\104; p>.05). Therefore, general self-esteem for treatment groups was higher than control groups on the posttest, but urban groups scored no higher than their rural contemporaries.

Posttest academic self-esteem scores analysis using ANCOVA, found results similar to the results for total self-esteem. The treatment group classes scored significantly higher than the control groups (F=12.70; df=1/104; p=.001). Urban groups scored significantly higher than rural groups (F=6.07; df=1/104; p<.015). Therefore, null hypothesis were rejected. The academic self-esteem increased among third grade classes who were involved in the school enrichment program. Among those involved in the program, students' scores increased more than the rural students.

ANOVA results of posttest wcores for parental self-esteem provide the basis for rejection of one of two null hypotheses. Treatment group classes scored significantly higher than control group classes (F=7.20; df=1/103; p=.009) but therewere no significant differences between rural and urban classes.

CONCLUSIONS AND IMPLICATIONS

In conclusion, at the time of the pretest, urban third grade classes were found to have higher total, general, and academic self-esteem that their rural counterparts. Control and treatment groups were found to be equivalent. The results of the pottest indicate that the school enrichment program, Meet the Plants, did increase self-esteem significantly in the following categories: total, general, academic, and parental in all treatment groups, rural and urban. Additionally, urban classes responded with significantly higher scores than rural classes for the categories: total and academic self-esteem.

Reasons for the increase in self-esteem may be due to the "hands-on, learning-by-doing" emphasis of 4-H projects. Prominent educators and psychologists advocate youth participation as another back-to-basics movement that supersedes the three R's. They believe youth participation to be the foundation of all learning because it gives motivation and meaning to the student's experiences. Additionally, they advocate it provides skills and understandings needed by youth to develop mental health, to deal effectively with themselves and others, and provides a link between school, home and community (Brownfenbrenner, 1979; Crisci, 1981; Combs, 1981).

The findings of this study provide some evidence that school enrichment experiences are providing self-concept building experiences in addition to knowledge gained in subject matter, However, it is recognized that further research on a much broader basis may need to be conducted before conclusive evidence can be made concerning 4-H and development of self-esteem.

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The Effect of an Experienced-Based School Enrichment Program in Plant Science on Third Grade Students' Self-Esteem
A Critique

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I am pleased that the researchers have recognized the experiential education literature base and have built a study around this very important theory. Much of what is accomplished in 4-H programs is undoubtedly attributable to the attention that is placed upon practical experiences that build upon sound theoretical underpinnings.

The authors of this paper have only touched a portion of the experiential education literature base that is currently available. My suggestion for future researchers is to take a new look at the writings of John Dewey along with the recent work of David Kolb and Donald Schön. Each writer could provide a much more detailed and sound theoretical basis for this type of literature review.

The researchers are to be commended for stating the need for a "broader" focus on the development of young people. They have brought attention to the fact that knowledge and skill in subject matters is not enough. However, it never become clear to me what "broader" experiences really means. The Meet the Plants program must be an example of a "broader" experience but the reader is left somewhat uninformed about what it was that made the program really significant.

I commend the researchers on conducting a sound study in terms of instrumentation, data collection, analysis and presentation. The conclusions, based upon the statistical testing performed, are warranted. The differences identified between the control and treatment groups certainly do come across very clearly in the tables. I am amazed that one 6-8 week supplemental activity could cause such a difference. I wonder if it might have been a better design to have the control groups involved in some type of non-experiential activity rather than no activity at all. My suspicions are that part of the improvement that was measured among the treatment group could have resulted simply from receiving extra attention over that 6-8 week period.

The authors' honest attempt to explain the complex problems encountered in sample selection is commendable. I must ask one very obvious question -- if, as is stated in the limitations section, this study cannot be generalized beyond the participants in the study then why do we go through the process of calculating inferential statistics? I suggest that since the sampling problem is so difficult to overcome within a volunteer context, future researchers contemplating studies of this type consider a more-qualitatively focused or case study approach using only descriptive statistics.

THE INFLUENCE OF A LEADER JOB DESCRIPTION AS A COMPONENT OF 4-H LEADER DEVELOPMENT

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INTRODUCTION

The "4-H Organizational Leader" is a crucial link between cooperative extension agents and 4-H club members. Pesson (1960) defines the local leader as a person who voluntarily contributes his time and energy to the leadership of young people in a 4-H club. Haas (1979) describes responsibilities of leaders in the statement, "Voluntary 4-H leaders are responsible for organizing and coordinating activities that help 4-H members develop. Their support and guidance provide the basis for members' development. Voluntary 4-H leaders are the key people in organizing 4-H club activities and ensuring that the aims and objectives of the 4-H program are met." (p. 10).

Leaders normally have more frequent contact with club members than do extension agents. According to Schwertz (1978), one extension agent working directly with youth will reach about 200 4-H members with a reasonably effective program. Working with volunteer 4-H leaders at the local club level, this same agent could reach about 500 to 800 members and have about 40 volunteers in the 4-H program.

In 1979, the United States Department of Agriculture issued a "Joint Committee Report on Extension Programs, Policies, and Goals" which stated that without local volunteer leaders, extension could not carry on as extensive a program as it does. Such leaders perform a variety of functions, both educational and organizational.

Since 4-H organizational leaders play a vital role in the development of club members, it is important that qualified personnel be recruited and trained to take on their leadership responsibilities. Parish agents in Louisiana seldom have the opportunity to recruit qualified volunteers. School principals usually appoint school personnel to serve as 4-H leaders.

In Louisiana, the State Board of Elementary and Secondary Education recognizes 4-H as a co-curricular activity. Therefore, the majority of Louisiana 4-H clubs are connected with parish school systems. The 4-H program is operated cooperatively with the local school boards and most of the 4-H meetings are held during school hours.

It is the belief of many parish extension agents that an individual club is only as productive as the organizational leader supervising it. Therefore, the Louisiana Cooperative Extension Service State 4-H staff made a concerted effort to increase support given to 4-H organizational leaders by parish extension agents. Several major areas of support were encouraged under this concept. These areas included a leader job description for the parish situation, individual agent-leader conferences, circular letters, group leader training, providing printed materials (handbook, manuals, etc.), and telephone visits.

Agents from 18 parishes volunteered to take part in this leader development program. Each parish was to set its own goals to increase support given to 4-H organizational leaders. A common goal of all participating parishes was to develop a specific leader job description.

The 1986-87 school year was the first organized attempt by parish extension agents to present local 4-H organizational leaders with a written "Leader Job Description" (LJD). A basic leader job description was composed by the Louisiana Cooperative Extension Service State 4-H Staff. The purpose of the leader job description was to inform leaders of specific tasks to be accomplished in a given school year. An important consideration was whether or not a written leader job description would influence a volunteer leader's job performance.

This study involved leaders in 11 of the 18 parishes in Louisiana participating in the leader development program. Agents in the selected 11 parishes developed written job descriptions with similar leader tasks and then implemented their job descriptions in a similar fashion prior to the start of the 1986-87 school year.

OBJECTIVES

The purpose of this study was to describe 4-H organizational leaders' perceptions of the influence of a leader job description on performance of specific 4-H leader tasks. The major objectives of the study were as follows:

1. to describe the level of performance, as measured by the number of tasks performed by 4-H organizational leaders.
2. to determine the primary sources perceived by 4-H organizational leaders as influencing their decision to perform a task.
3. to describe 4-H organizational leaders on selected personal and professional characteristics.

PROCEDURES

The target population for this study was 4-H organizational leaders in 11 Louisiana parishes. Three hundred twenty-seven leaders were identified by 4-H agents from the 11 participating parishes. A minimum sample size of 176 leaders was determined using the formula reported by Cochran (1963, p. 54). Leaders were selected using a systematic random sampling method. Every fourth name from the frame of the population was chosen until the needed sample size was achieved. Two-hundred ten questionnaires were mailed. The researcher oversampled by 34 in an attempt to insure reaching the minimum required sample size.

The major source of information used in designing the instrument was the leader job descriptions utilized by the 11 parishes. Additional sources of support provided by agents to leaders were also used in the development of the instrument. Those sources included personal visits, circular letters, printed materials, group training and telephone visits.

The questionnaire was divided into two sections. Section one contained 30 activities commonly performed by leaders. Sources of support administered by agents to influence leaders to perform the activities were also included in this section. Questions providing demographic information and leaders' perceptions of their understanding of responsibilities and influence of the LJD were listed in section two of the instrument.

The instrument was reviewed by a validation committee. The committee was informed of the purpose of the study and asked if the instrument would be effective in gathering the necessary data. Suggestions from the committee were reviewed and incorporated in the development of the final instrument.

Data for this study were collected from 4-H organizational leaders by mailed questionnaires. Approximately 50% of the questionnaires were returned after ten days. A postcard was mailed to the leaders not returning the original questionnaire as a follow-up reminder. An additional 15% were received and the decision was made to conduct a second follow-up. This second follow-up consisted of a reminder letter, self-addressed, stamped envelope and the questionnaire. A total of 172 leaders responded providing the data analyzed in this study.

Analysis of Data

Statistical analysis of the data included:

1. Frequency distributions to summarize number of tasks completed, sources of most influence, and demographic information.

2. Leader activity scores to determine the total number of tasks performed by leaders.

3. Leader job description scores to determine the total frequency in which the LJD was selected as the source of most influence.

RESULTS

Of 210 questionnaires mailed, 172 leaders responded. Respondents served as leaders during the 1986-87 school year and were surveyed in May, 1987.

Tasks Completed and Influence of LJD

A summary of leader responses for performing the 30 tasks included in the instrument and the influence of the LJD is shown in Table 1. Only four of the 30 tasks were performed by less than 50% of the respondents. Two of these four tasks involved recruiting teachers/parents to chair individual activities or projects. Recruiting and training other leaders to assist with the 4-H club and coordinate transportation to parish contests/activities were also performed by less than 50% of the respondents.

The task performed by the greatest number of 4-H organizational leaders (171) was "attend scheduled 4-H club meetings" (99%). Five additional tasks were performed by 165 or more leaders (96%-98%). Those tasks were: "encourage members to participate in parish activities" (98%), "maintain discipline in club meetings" (97%), "Make announcements of meeting date, time, and room" (97%), "secure approval of school administration for club activities (97%), and "supervise enrollment of club members" (96%).

Seven sources of agent to leader support were listed on the questionnaire as follows: leader job description (LJD), personal visits (Prsnl. Vsts.), circular letters (Cir. Ltrs.), printed material (Prt. Mtrl.), group training (Grp. Trng.), telephone visits (Phone Vsts.), and other. The LJD influenced 50% or more of the leaders to perform 15 of the 30 tasks. Seventy-four percent of the leaders who attended scheduled club meetings indicated that the LJD was the most influential source supporting their decision to attend those 4-H meetings. The LJD had the least influence on leaders' decisions to coordinate transportation to parish contests and activities.

Leader Characteristics

The following is a summary of the major findings for leader characteristics:

1. Eighty-three percent of the leaders were female.
2. The length of service as a 4-H leader averaged 6.7 years.
3. Twenty-three percent of the respondents were leaders for the first time (1 year).
4. Ninety-three percent of the leaders were teachers.
5. Fifty-three percent of the leaders surveyed were 4-H club members with an average length of membership of 4.9 years.
6. Forty-six percent of the clubs were located in towns under 10,000 people and open country.
7. The elementary grade levels (fourth through sixth grade) totaled 52% of the clubs represented by surveyed leaders.
8. The average number of 4-H members enrolled in the clubs was 36.

Table 1

Tasks Performed by 4-H Organizational Leaders and Influence of the Leader Job Description for Performing Leader Tasks

Tasks	Performed Task		LJD Influence	
	n	%	n	%
Attend scheduled 4-H club meetings	171	99	127	74
Encourage 4-H members to participate in parish activities	168	98	70	41
Maintain discipline in club meetings	167	97	92	55
Make announcements of meeting date, time, and room	167	97	87	52
Secure approval of school administration for club activities	167	97	76	46
Supervise enrollment of club members	165	96	113	68
Conduct club's officer election	156	91	110	71
Assist in planning club activities	147	85	79	55
Secure materials needed for meeting	144	84	64	45
Keep 4-H agents informed of club activities	144	84	51	35
Assist and check on progress of 4-H members' record book	140	81	78	55
Have special club meetings in addition to regular monthly meeting as needed	136	79	69	50
Train officers to perform their duties	135	78	70	51
Plan/conduct National 4-H Week/other promotional activities	133	77	56	42
Meet with officers monthly prior to regular meetings to plan agenda and program for the meeting	131	76	72	56
Assist in preparing club members for parish contests/activities	131	76	67	52

(table continues)

Table 1 (continued)

Tasks	Performed Task		LJD Influence	
	n	%	n	%
Publicize local club activities and accomplishments through club reporter	125	73	60	48
Assist members in project selection	125	73	66	52
Make list of all members and projects they are enrolled in	125	73	81	65
Visit with principals on 4-H activities, concerns and accomplishments (monthly)	122	71	58	47
Provide or secure from agent necessary information to insure project leaders will do their job	112	65	41	37
Keep record of 4-H´ers project work/accomplishments	107	62	63	59
Provide or secure from agent necessary information to insure activity leaders will do their job	104	60	40	38
Plan with officers an annual calendar of activities	99	57	63	64
Involve parents in transportation, educational programs, and awards	93	54	35	38
Plan and conduct fund raising activities	90	52	37	41
Coordinate/assist with transportation to parish contests and/or activities	84	49	29	34
Recruit teachers/parents to chair individual activities	77	45	29	37
Recruit and train other leaders to assist with your club	57	33	28	48
Recruit teachers/parents to chair individual projects	47	27	21	45

Note: n = 172

Leader Understanding / LJD Effectiveness

The following is a summary of the major findings for leaders understanding of job responsibilities:

1. Leaders rated understanding of their job in 1986-87 as good (mean = 3.1) on a scale of 1 (poor) to 4 (excellent).
2. Leaders having served two or more years rated understanding of their job in the previous year, 1985-86, as good (mean = 3.1) on a scale of 1 (poor) to 4 (excellent).
3. Leaders rated their understanding of the total parish 4-H program in the good range (mean = 2.9) on a scale of 1 (poor) to 4 (excellent).
4. Leaders rated the LJD as a good tool for increasing effectiveness as a 4-H leader with a mean of 3.1 on a scale of 1 (poor) to 4 (excellent).
5. Leaders rated the LJD as a good tool for increasing awareness of responsibilities as a 4-H leader with a mean of 3.2 on a scale of 1 (poor) to 4 (excellent).
6. Leaders rated the quality of training received as a 4-H club leader in the good range with a mean of 2.9 on a scale of 1 (poor) to 4 (excellent).

CONCLUSIONS and RECOMMENDATIONS

Based on the findings of this study, the following conclusions and recommendations were drawn.

1. Leader job descriptions have a positive influence on leaders performing specific tasks.

This conclusion is based on the findings that the LJD was selected more often as the source of most influence in performing 28 of the 30 tasks listed. The LJD influenced 50% or more of the leaders to perform 15 of the 30 tasks suggested. The researchers recommend that the LJD be utilized by agents as a feature of their leader development programs. The job description should have specific tasks that are understandable and related to the program goals. A written job description should be presented to leaders by the agent prior to the start of the school year. 4-H agents should explain the tasks listed on the LJD and periodically remind leaders of those tasks.

2. The LJD would be an effective source of support in orienting new leaders.

This conclusion is based on the findings that respondents rated the LJD as a good tool for increasing effectiveness as a leader. More importantly, leaders rated the LJD as a good tool for increasing leaders' awareness of responsibilities. According to Cull and Hardy (1974), orientation should make leaders aware of their responsibilities.

The researchers recommend that the LJD be utilized by agents as an instrument in orientation of new leaders. A written job description would allow new leaders to set expectations and plan ahead. The LJD should be presented to the new leader by the agent on an individual basis. An individual orientation session would allow the agent to explain tasks and the leader an opportunity to ask questions.

3. Organizational leaders perceived that they have a good understanding of their job responsibilities.

This conclusion is based on the responses of 4-H leaders when asked to rate their understanding of their job as a 4-H club leader on a scale with values of 1 (poor), 2 (fair), 3 (good), and 4 (excellent). Leaders rated their understanding of their job for 1986-87 as good (mean = 3.1), SD = .703). Leaders having served two or more years rated their understanding of the job in the previous year, 1985-86, as good (mean = 3.1, SD = .738).

The researchers recommend that agents continue efforts to increase leaders' understanding of their job responsibilities by incorporation of the LJD. In addition to orientation of new leaders, the LJD should be presented annually to veteran leaders. Annual presentation of a job description would inform experienced leaders of new or revised responsibilities as well as remind them of traditional tasks.

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VOCATIONAL ENROLLMENT PATTERNS AND OCCUPATIONAL ASPIRATIONS OF AMERICAN HIGH SCHOOL STUDENTS IN 1982: A CAUSAL ANALYSIS

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It is generally accepted that high school students enrolled in vocational education come from a lower socio-economic status than non-vocational students (Gordon, 1984). Wolfle (1985) found that vocational students have lower occupational aspirations than non-vocational students.

In a study assessing adolescents career aspirations, Marjoribanks (1987) found that differing family environments played a major role in influencing the occupational aspirations of youth especially in females and working-class males. Lee and Ekstrom (1988) concluded that effective guidance counseling regarding career choices is not as readily available to minority students from low socio-economic families or to students from rural areas as it is to other groups of students. Miller (1987), in a study of career counseling for high school students, found that secondary students consider (a) their parent's opinions, (b) the degree of control they will have over their lives with their chosen career and (c) the intrinsic and extrinsic values associated with the career, when deciding upon a vocation.

A landmark study conducted by Duncan, Haller and Portes (1971) tested a causal model that attributes part of the decision to attend college to socio-economic status. But, they also believed that socio-economic status is not a complete explanation for occupational aspirations. Heyns (1974) reported that the overall curriculum followed by students in high school had a greater impact on their occupational aspirations than did grades, parental education, parental occupations, and siblings.

From this brief review of the literature, the reader can readily determine that many variables interact, with each contributing a portion of the influences bearing upon the student as he or she makes a career choice. The question is whether the negative effects of vocational enrollment patterns remain when the effects of those other variables is taken into account.

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PURPOSE AND OBJECTIVES

The overall purpose of this study was to examine the impact of vocational education enrollment on the occupational aspirations of American high school students, after correcting for the effects of other variables that also affect those aspirations. In order to address that broad purpose, the following objectives were identified:

1. To identify pertinent variables that reasonably could be expected to affect both vocational enrollment pattern and occupational aspirations.

2. To develop a causal model to examine the effects of vocational education enrollment pattern on occupational aspiration, taking into account the effects, both direct and indirect, of those confounding variables.

PROCEDURES

Data Source

The data used for this study was that collected in the High School and Beyond Sophomore Cohort study (Office of Educational Research and Improvement, 1984). Base year survey data were collected on over 30,000 high school sophomores in United States during 1980. The same students were surveyed again during school year 1982 for follow-up information. After completion of the school year, official school transcript data were collected. For this study, data from both the basic survey and from the transcript tapes were sub-sampled and merged.

In order to discuss causality, temporal ordering is a necessary but not sufficient condition. The High School and Beyond, sophomore cohort, second followup (Office of Educational Research and Improvement, 1984) was selected as the source of data for two reasons: 1) because it provides data on the variables that were determined to be appropriate, and 2) because those variables were collected at two different times, thus allowing for temporal ordering.

Variables

The model proposed is in four blocks (see figure 1). The first block contains two exogenous variables: sex and socioeconomic status (SES). Sex was based on student self-reporting. SES was a standardized composite based on both parents' educations, father's occupation, material possessions in home, and family income as reported by the student during the 1980 data collection.

The second block contains one endogenous variable, which is referred to as basic ability, and which was measured by a series of tests of math, reading, and vocabulary standardized aptitude tests administered in 1980, during the students' sophomore year. The third block contains two endogenous variables: vocational enrollment pattern measured as a composite variable from transcript data collected at the end of 1982 and high school grade point average, also computed from the student transcript data.

The fourth block contains the criterion variable, which is the students' expressed occupational aspirations at age 30, collected in the 1982 survey. The variable as reported was in a nominal form, with the student indicating an aspiration to become either a farmer, clerk, sales person, professional, or one of numerous occupational groups by age 30. The researchers used two panels to order the occupational categories and to create an interval variable for the analysis.

It could be argued that grade point average and vocational pattern were collected after aspirations were expressed, thus disrupting the temporal ordering of the variables. On the other hand, we believe that grades and enrollment pattern were being established over an extended period of time, and only the time of their collection was after the time when aspirations were expressed. For the purposes of this study, the temporal ordering as indicated in figure 1 is held to be defensible and is assumed to be correct.

ANALYSIS OF DATA

For the purposes of the study, the assumptions of homoscedasticity, underlying normal distributions, and interval data were made. Recognizing the problems inherent in those assumptions, we believe that the basic robustness of the procedure used (Kenny, 1979) allows such analysis.

The nature of the data set is such that specific populations of minorities and special targeted groups were over-sampled to insure adequate sample sizes for analysis. The effects of this over-sampling was corrected by the use of a weighting factor for each student's scores, as recommended by the Office of Educational Research and Improvement (1984). The use of such weights substantially affects the computations, particularly the variance-covariance matrix. Only by using them, can we generalize the results reported directly to the population of all members of the United States public and private high school sophomore class of 1980, remaining in school in 1982.

The sex variable was dummy-coded (m=1, f=0). The vocational enrollment pattern was coded concentrator = 4, limited concentrator = 3, sampler = 2, non-participant = 1. Other variables were used as reported in the data set, or were recoded to allow more simple interpretation of the results.

Simple, descriptive statistics were computed -- mean, minimum, and maximum -- for each of the variables in the model, see Table 1. In addition, the first order Pearson Product-Moment correlation matrix was computed.

The model developed was a simple recursive one, thus it was just identified. Accordingly, ordinary path analysis provides an appropriate solution to the solution of the structural equations model (Pedhazur, 1982). The analysis technique used was the multiple regression procedure in the SAS package. To allow a more elaborate interpretation of the relative effect size and to eliminate interpretation problems arising from the skewing produced by the use of the weighting factors, we are reporting standardized path coefficients.

RESULTS

An examination of Table 1 provides a fairly clear picture of the nature of the variables in the model. High school grade point average was measured on a 0 - 4 scale. Of the 8,947 students in the study, GPAs ranged from 0.9 to 4.0, with a mean of 2.63. Vocational enrollment was reported on a 1 - 4 scale. Vocational enrollment patterns for students in the study ranged from 1.0, no vocational courses, to 4.0, vocational concentrator. The SES variable is a standardized composite, so Z-scores are reported.

It is worthy of note that the measure of dispersion reported is that of range rather than the more conventional standard deviation. The computation of standard deviations produced erratic and uninterpretable results because of the use of the weighting function discussed earlier. Hence, reporting them would not serve a useful purpose.

Table 1.
Sample Size, Means, Minimum, and Maximum Scores of Selected Variables

Variable	n	Mean	Min	Max
High School GPA	8947	2.63	0.90	4.00
Voc. Enrollment	8947	2.71	1.00	4.00
Basic Ability	8947	51.08	28.50	74.24
SES	8947	-0.02	-2.82	2.15

Table 2 shows the uncorrected (first order) correlations among the variables in the model. The strongest relationships are those between basic ability and grades ($r = .556$) and between socio-economic status and basic ability ($r = .428$). The correlation between vocational enrollment pattern and occupational aspirations ($r = -.317$) is low, negative (Hinkle, Wiersma, & Jurs, 1979). With the extreme size of the sample ($n = 8947$), all of the correlations are significant well beyond $p < .01$.

Table 2.
Correlation Coefficients of Selected Variables

	Occupational Aspiration	High Schcol GPA	Vocational Enrollment Pattern	Basic Ability	SES	Sex
OCC Asp	1.000	.161	-.317	.281	.219	.035
GPA		1.000	-.177	.556	.261	-.164
Voc Enrol Pattern			1.000	-.338	-.292	-.049
Basic Ability				1.000	.428	.056
SES					1.000	.041
Sex						1.000

$p < .01$ on all coefficients

Figure 1 shows the results of the path analysis using standardized regression coefficients as path coefficients and correlations between non-causally related variables. The major contributor to basic ability was socio-economic status ($b = +.428$). Basic ability was the major contributor to both grade point average ($b = + .550$) and to vocational enrollment pattern ($b = -.249$). Vocational enrollment pattern, was the major contributor to occupational aspirations ($b = -237$). See Figure 1. Use of the tracing rule for computing effects, produces a total effect of -.239 from vocational enrollment pattern to occupational aspiration, but the additional effect (.002) is non-causal, and may be ignored. Total direct effects for the model are given in Table 3.

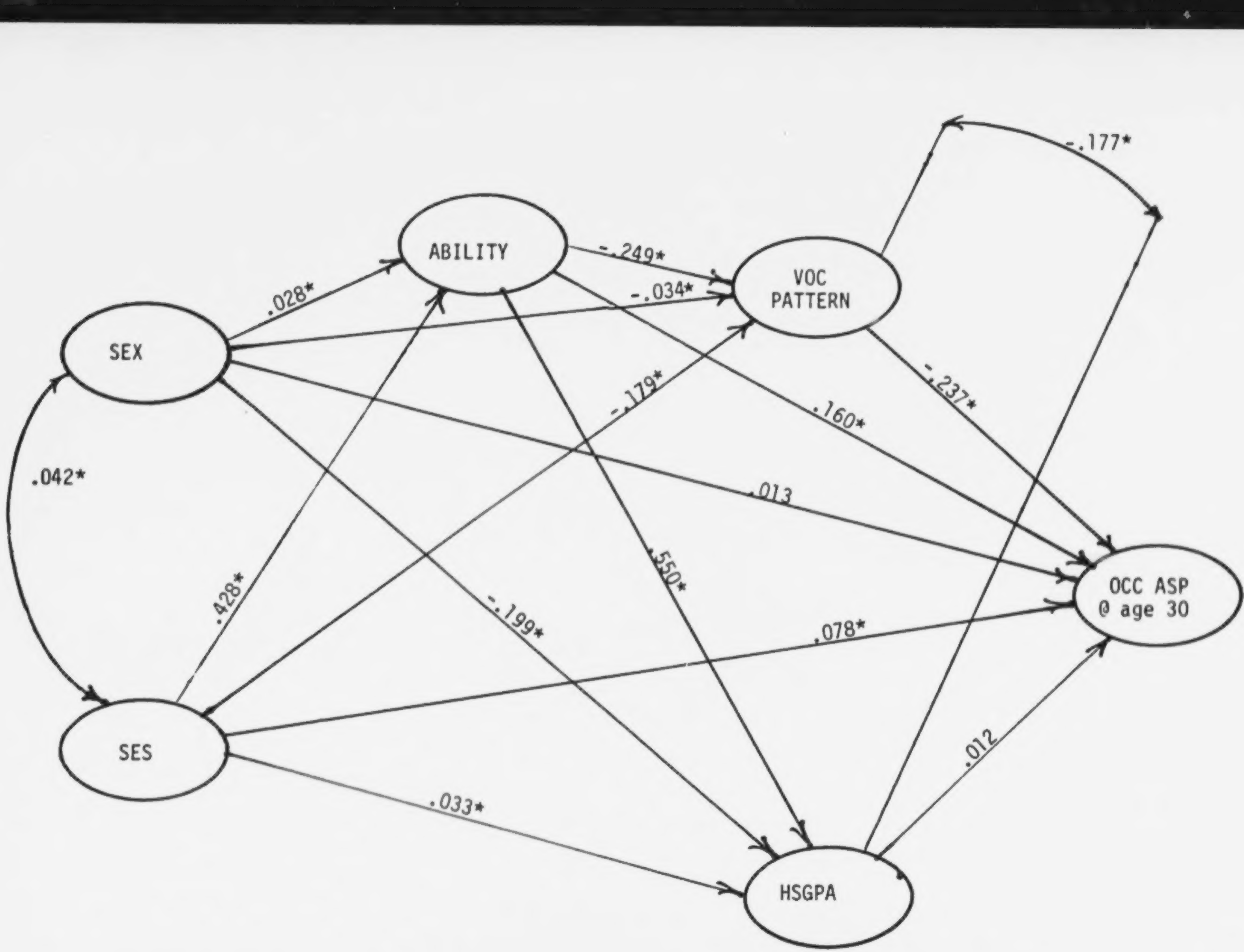
ABILITY
VOC PATTERN
SEX
SES
HSGPA
OCC ASP @ age 30
-.177*
-.249*
-.034*
.028*
-.179*
.160*
-.237*
.042*
.013
.550*
.428*
-.199*
.078*
.012
.033*

Figure 1. Path Diagram for Causal Model of High School Sophomores' Occupational Aspirations at Age 30, Using Standardized Path Coefficients.

* p < .01

Table 3
Total Causal Effects on Occupational Aspirations

	Direct Effects	Indirect Effects
Sex	.013	.007
SES	.078	.096
Vocational Pattern	-.237	-
Ability	.160	.065
Grade Point Average	.012	-

CONCLUSIONS

Even when correcting for the effects of gender, socioeconomic status of family, basic ability, and high school grade point average, the students with enrollment in vocational education express lower occupational aspirations than non-vocational students. The size of the effect, however, is markedly lowered (from -.317 to -.237) by correcting for those variables.

The results of this study support the findings of Wolfle (1985) and Heyns (1974) that enrollment in vocational programs produces reduced occupational aspirations among students.

RECOMMENDATIONS

We can determine no clear reason for this phenomenon. Yet, the data produce clear results, even though the effect is small and the R^2 is negligible. Thus, we believe that two recommendations are warranted.

1. With 86% of the variance unexplained, it is clear that the underlying causes of occupational aspirations remain a mystery. Thus, further research is needed to determine what variables other than the ones examined in this study produce the actual effect.

2. The evidence is convincing that there is a lowering of occupational aspirations among students as their vocational enrollment becomes more extensive. Thus, vocational educators should emphasize the upward career mobility provided by vocational education and not merely the entry-level aspect of the programs.

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VOCATIONAL ENROLLMENT PATTERNS AND OCCUPATIONAL ASPIRATIONS OF AMERICAN HIGH SCHOOL STUDENTS IN 1982: A CAUSAL ANALYSIS A CRITIQUE

David L. Howell, University of New Hampshire--Discussant

The purpose of this study was to gather information relating to the impact of vocational education enrollment to the occupational aspirations of high school students.

Strengths

The authors made use of data collected in the study "High School and Beyond, 1980 Sophomore Cohort Second Follow-Up" from the Office of Educational Research and Improvement. The authors are to be commended for making use of data which was available rather than collecting it again. Much of the government data collected today is not analyzed to the extent of its usefulness yet most researchers don't consider its availability.

Useful tables were included which added clarity to the paper.

Weaknesses

The authors suggest that this is a study which uses a causal analysis. While it is recognized that some researchers do consider this appropriate, others believe that with limited support to identify the cause and the effect it is not possible to show a cause effect relationship and therefore this method of analysis has limited application.

The validity and reliability of the instrument used in the study are important to know when evaluating the results, yet the authors make no mention of them. I suggest that, even with the page limitations of this report, this information is too important to be deleted.

The findings show that no factors were highly correlated in the study. The authors state that 86% of the variance is unexplained. I therefore caution the authors about making the statement that the evidence was convincing among any of the variables. There is no support for such a statement.

Recommendations

The authors suggest that further research in this area is needed which I support, but maybe we should also consider using some qualitative research to identify these variables. Perhaps the quantitative methods do not lend themselves to identifying the variables as readily.

VOCATIONAL SUPERVISOR BURNOUT AND JOB SATISFACTION

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INTRODUCTION

Over the past 15 years, there has been an explosion of research and inquiry into the burnout phenomenon. The study of burnout has moved from a hot topic to a serious issue which affects millions of workers (Farber, 1983). "Burned out professionals are more frequently absent or late for work than their non-burned out colleagues; they become noticeably less idealistic and more rigid; their performance at work deteriorates markedly; and they may fantasize or actually plan on leaving the profession" (Farber, 1983, p. 3)"

Past studies of burnout have provided baseline data that bring the burnout phenomenon into focus. Studies have shown that burnout-prone individuals are not lazy or underachievers but are in fact characterized as overachievers, dynamic, charismatic, empathetic, dedicated, idealistic and people oriented (Freudenberger & Richelson, 1980). Burnout has been most prevalent among workers in the helping professions. Studies have shown that these individuals suffer from high stress levels (Freudenberger, 1974, 1981; Freudenberger & Richelson, 1980; Maslach, 1976; Pines & Maslach, 1978) and low job satisfaction (Freudenberger, 1975; Igoden, 1984; Maslach, 1978; Newcomb & Clark, 1985). Brookins (1982) and Cooper and Marshall (1980) found that administrators also experience high stress and low job satisfaction. Administrators reported that "70% of their total life stress resulted from their jobs" (Cooper & Marshall, 1980, p. 77).

This linkage between stress, job satisfaction, and the work environment is critical to the study of burnout. In fact, Maslach (1978) stated that, when looking for possible reasons for burnout, one is better off not to try to identify the bad people in an organization but instead uncover the characteristics of bad situations where good people function. Three of the major related problems involve role ambiguity, role conflict and role overload (Caplan & Jones, 1975: Kahn, 1974; Newcomb & Clark, 1985; Pines, Aronson & Kafry, 1981).

Reorganizations within school systems have forced vocational supervisors to face each of these potential stressors. Many supervisors have been delegated new responsibilities, such as supervision of non-vocational teachers, supervision of teachers outside their interest area, and performance of routine work such as hall duty (Barrick, 1987). These new job duties have often been accompanied with a lack of clarity in defining responsibilities, goals or means of accountability. Many supervisors find that they must involve themselves in activities they perceive to be outside of their domain of work. Financial constraints have forced supervisors to become lobbyists and politicians as well as organizational administrators. Role overload continues to be a major problem. Not only has the workload increased but the tasks one is required to do may soon exceed the current abilities of the individual. Finally, role ambiguity among clients served has been identified as a source of potential dissatisfaction (Barrick, 1987). Based on previous research showing the linkage between work stress, job satisfaction, and burnout, vocational supervisors are prime candidates for burnout.

PURPOSE AND OBJECTIVES

Burnout could severely limit the competence, vitality and commitment of vocational supervisors. This limitation of supervisory performance may not only lead to a lowered administrative standard but may well lead to a tremendous human and financial waste due to individuals functioning at less than full potential. The purpose of this study was to determine the level of burnout, job satisfaction, occupational stress, personal strain, and personal coping resources of vocational supervisors.

The objectives of the study were to: (1) determine the level of burnout, job satisfaction, personal strain, occupational stress, and personal coping resources of vocational supervisors in Ohio, and (2) determine the differences in levels of burnout, job satisfaction, personal strain, occupational stress, and personal coping which exist among vocational supervisors by service areas.

PROCEDURES

Population

The population of the study consisted of vocational supervisors in Ohio (N = 202). Due to the small number of individuals in the population, a census was used for this study. The supervisors included agriculture, business education, home economics, marketing, and trade and industrial education.

Design

Descriptive research was used in this study to obtain the data necessary to answer the objectives. The study was designed to investigate the following variables: Independent variables: Job satisfaction, occupational stress, personal strain, personal coping resources; Dependent variables: Burnout (subcategories: emotional exhaustion, depersonalization, personal accomplishment).

Data Collection

Data were collected by means of a mailed questionnaire to all individuals in the population. The first mailing of the questionnaire was sent on March 11, 1988. The second mailing was sent on April 14. A 92% response was obtained from the first and second mailings. Non-response error was controlled by comparing early respondents to late respondents. No significant difference was found between early and late respondents. Therefore, the responses were generalized to the entire census.

Instrumentation

The mailed questionnaire consisted of six portions. These were: job satisfaction, occupational stress, personal strain, personal coping resources, Maslach Burnout Inventory, and personal characteristics. A modified version of the Brayfield-Roth "Job Satisfaction Index" was used for this study (Warner, 1973). Previous research with administrators/mid managers obtained a Cronbach's alpha of .84. The variables of occupational stress, personal strain, and personal coping resources were measured by instruments developed by Osipow and Spokane (1983). The Cronbach's alpha was determined for these instruments to be .89, .94 and .88, respectively. The level of burnout was determined by use of the Maslach Burnout Inventory (MBI) designed by Maslach and Jackson (1981). A Cronbach's alpha of .83 for the frequency dimension and .84 for the intensity dimension were obtained. Each of the instruments in the study has been used with educational administrators and has been proven to be valid by either content validity or concurrent validity.

ANALYSIS OF DATA

All data were analyzed using the Statistical Package for Social Sciences ($SPSS_x$) at The Ohio State University. Frequencies, percentages, means, standard deviations, and analysis of variance were used to describe the data. An alpha level of .05 was set a priori.

RESULTS

Job Satisfaction

The majority of the vocational supervisors (59%) were very satisfied with their jobs. An additional 35% were moderately satisfied with their jobs. Only 6% of the supervisors indicated that they were slightly satisfied with their jobs. None of the supervisors indicated that they were dissatisfied with their jobs (Table 1).

Table 1 Job Satisfaction Scores (n = 181)

	f	%
40-50 (slightly satisfied)	10	6
51-59 (moderately satisfied)	60	35
60-70 (very satisfied)	101	59
Total	171	100

Note. Possible range = 14-70; range 40-70; mean 60.7.

Occupational Stress

As shown in Table 2, the majority of vocational supervisors (94%) scored in the two lower quartiles, indicating medium to low levels of overall occupational stress. Scores on the occupational stress subscales indicated that role insufficiency, role ambiguity, and role boundary were not problems for supervisors. Role overload and scope of responsibility scores constituted the largest portion of occupational stress with 39% and 47% of the individuals scoring in the upper two quartiles, respectively, which indicated moderate to high levels of stress (Table 3).

Personal Strain

Personal strain did not appear to be a problem for supervisors. The majority of individuals (98%) were in the lower two quartiles which indicated low to moderate levels of personal strain (Table 4). Supervisors indicated the subscales as indicated by the percentage of supervisors scoring in the lower two quartiles: vocational strain (100%), psychological strain (97%), interpersonal strain (98%) and physical strain (95%) (Table 5).

Table 2 Overall Occupational Stress (n = 181)

	f	%
50- 99 (low)	25	15
100-149 (moderately low)	128	79
150-199 (moderately high)	10	6
200-250 (high)	0	0
Total	163	100

Note. Mean = 117.4; range = 80-177.

Table 3 Occupational Stress Subscales (n = 181)

	Role Overload		Role Insufficiency		Role Ambiguity		Role Boundary		Scope of Responsibility	
	f	%	f	%	f	%	f	%	f	%
10-19 (low)	6	3	101	57	46	26	90	51	2	2
20-29 (mod. low)	101	58	64	35	100	57	76	43	89	51
30-39 (mod. high)	65	36	14	8	28	16	12	6	79	45
40-50	6	3	0	0	2	1	0	0	3	2
Total	178	100	179	100	175	100	178	100	173	100
Mean	28.8		19.5		18.9		20.7		29.2	

Note. Possible range on each subscale = 10-50.

Table 4 Overall Personal Strain (n = 181)

	f	%
40- 79 (low)	131	85
80-119 (moderately low)	21	13
120-159 (moderately high)	2	2
160-200 (high)	0	0
Total	154	100

Note. Mean = 65.7; range = 43-144.

Personal Coping

The majority of supervisors scored in the highest two quartiles (94.8%), indicating good usage of personal coping strategies in dealing with stress (Table 6). Of the subscales, recreation as a coping resource was low to moderate in usage (48%). Social support systems (support and help from those around them) were highly utilized (96%). The majority of supervisors (93%) use cognitive skills to deal with job stress as indicated by the rational coping subscale (Table 7).

Table 5 Personal Strain Subscales (n = 181)

	Vocational Strain		Psychological Strain		Interpersonal Strain		Physical Strain	
	f	%	f	%	f	%	f	%
10-19 (low)	149	85	134	75	120	72	138	79
20-29 (moderately low)	26	15	39	22	43	26	27	16
30-39 (moderately high)	0	0	3	2	3	2	6	4
40-50 (high)	0	0	2	1	0	0	1	1
Total	175	100	178	100	166	100	172	100
Mean	15.7		16.5		17.4		16.1	

Note. Possible range on each subscale = 10-50.

Table 6 Overall Personal Coping

	f	%
30- 59 (low usage)	0	0
60- 89 (moderately low usage)	9	5
90-119 (moderately high usage)	112	65
120-150 (high usage)	52	30
Total	173	100

Note. Mean = 110.7; range = 71-138.

Table 7 Personal Coping Subscales (n = 181)

	Recreation		Social Support		Rational Coping	
	f	%	f	%	f	%
10-19 (low)	10	5	1	1	0	0
20-29 (moderately low)	76	43	6	3	11	7
30-39 (moderately high)	83	47	44	25	85	47
40-50 (high)	9	5	125	71	83	46
Total	178	100	175	100	179	100
Mean	29.7		42.4		39.0	

Note. Possible range on each subscale = 10-50.

Burnout

The Maslach Burnout Inventory (MBI) was used to obtain measures of burnout for the supervisors. The scale consisted of three major subscales: emotional exhaustion, depersonalization, and personal accomplishment. Each subscale obtained measures on two dimensions: frequency (how often supervisors had the feeling) and intensity (how strong the feelings were when experienced).

The majority of vocational supervisors were found to experience moderate to high levels of burnout as measured by the MBI. Percentages of individuals scoring in the high burnout category ranged from 14 to 30.6, depending on the subscale. These individuals indicated high levels of emotional exhaustion and depersonalization (distancing themselves from others). They also had low feelings of personal accomplishment (Table 8).

Table 8 Degree of Burnout (n = 181)

Level of Burnout	Burnout Subscales[a]											
	EEF		EEI		DPF		DPI		PAF		PAI	
	f	%	f	%	f	%	f	%	f	%	f	%
Low	95	53	82	47	99	58	66	38	87	51	71	42
Moderate	58	33	57	33	47	28	52	31	58	34	65	38
High	25	14	36	20	24	14	52	31	26	15	33	20
Total	178	100	175	100	170	100	170	100	171	100	169	100

[a] Emotional Exhaustion (EE), Depersonalization (DP), and Personal Accomplishment (PA); Frequency (F) and Intensity (I).

Relationship Between Burnout and Selected Variables

The strength of the relationship between job satisfaction and the burnout subscales ranged from low to moderate ($r = .27$ to $.44$). The data indicated that as the level of job satisfaction increased, the amount of emotional exhaustion and depersonalization decreased. Personal accomplishment also increased as job satisfaction increased.

The relationship between occupational stress and the burnout subscales ranged from a high of $r = .57$ for the emotional exhaustion frequency subscale to a low of $r = -.24$ for the personal accomplishment intensity subscale. These relationships revealed that the higher the stress level, the higher the emotional exhaustion and depersonalization levels for the supervisors. The personal accomplishment level was reduced as stress increased.

The relationship between personal strain and the burnout subscales ranged from very strong ($r = .78$) for the emotional exhaustion frequency subscale to moderate ($r = -.30$) for the personal accomplishment intensity subscale. These relationships indicated that as the supervisor's personal strain increased, their levels of emotional exhaustion and depersonalization also increased.

The level of personal accomplishment tended to decrease as strain increased. Low to moderate relationships were found between rational coping and the burnout subscales for emotional exhaustion and depersonalization (range: r = -.48 to r = -.26). Personal Accomplishment relationships with rational coping were found to be low to moderate (range: r = .38 to r = .27).

Relationship Between Vocational Supervisor Job Categories

Analysis of variance was used to determine if differences in job satisfaction, occupational stress, personal strain, personal coping or burnout existed among the five vocational areas. No significant differences among groups were found. Agriculture supervisors did not differ from any other supervisor groups for any of the burnout or job satisfaction categories.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations were based on the interpretation of the data presented in this study.

1. While it appears that job satisfaction, occupational stress, personal strain and personal coping are not major problems for vocational supervisors, attention should be paid to problems of role overload and the scope of responsibility of the individuals. These factors were the highest contributors to stress on the job and substantiate earlier studies of vocational agriculture supervisor role responsibilities.

2. Large numbers of vocational supervisors were experiencing high levels of burnout which demand attention. These individuals show high levels of emotional exhaustion, depersonalization (distancing themselves from others) and low levels of personal accomplishment.

3. Job satisfaction, occupational stress and rational coping have a direct bearing on the amount of burnout experience by supervisors. The more satisfied a supervisor is with their job and the more coping measures used to dissipate stress, the lower the degree of burnout. Increased levels of occupational stress and personal strain tend to increase the level of burnout.

The Ohio vocational education program and local schools must seriously look at the burnout problem. In times of tight fiscal constraints, no organization can afford to be spending large sums of money on individuals functioning at less than full potential. Special attention should be directed toward investigation of role overload and responsibility of vocational supervisors. In addition, supervisors should be made aware of the problems associated with burnout. This should be done through seminars, workshops or meetings which include time management, communication, stress reduction, human relations, and recognition of burnout symptoms.

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VOCATIONAL SUPERVISOR BURNOUT AND JOB SATISFACTION
A Critique

Dennis C. Scanlon, The Pennsylvania State University--Discussant

I compliment the researcher for recognizing a very real problem in the public school setting, and for identifying what I would agree is probably the number one cause of stress ... reorganization within the school and the administration. As we look at more and more reassignment and redefinition of job responsibilities we undoubtedly will see less job definition, more ambiguity of accountability criteria, and more role overload. The research design, population, data collection procedure, and instrumentation are all clearly defined.

The results left a great degree to be questioned. Table 2, Overall Occupational Stress, suggested that 153 of the 163 respondents were in a low to moderately low category indicating little overall occupational stress among the supervisors. However, Table 3, Occupational Stress Subscales, suggested that 39% to 47% of the individuals scoring in the upper two quartiles (153) were experiencing high levels of stress in the role overload and scope of responsibility category ... but these same individuals as reported in Table 2 were in a low to moderately low overall stress category.

It appears that these two subcategories mean very little in terms of overall stress, and raise a question as to how the five subcategories interact to raise overall occupational stress to a high level. Given the obvious observation the researchers might have done well to explain the "weighting" of each occupational subscale to the overall stress scale.

Table 8 raises the same kind of questions. How can the majority of vocational supervisors experience moderate to high levels of burnout (as reported by the researches) when it has just been previously reported that 94% were very to moderately satisfied with their jobs; 94% had a low to moderately low stress level; 90% indicated low to moderate levels of personal strain; and 95% suggested they had good use of coping strategies? Can I just assume that there is no relationship between the selected independent variables (job satisfaction, occupational stress, personal strain and personal coping) and the dependent variable, job burnout? The data suggest otherwise ... with R values ranging from 0.78 to -0.44.

If these are incorrect independent variables for predicting burnout then what are the right ones? The conclusions suggest that you believe these variables to have some relationship to burnout. You say "job satisfaction, occupational stress, and rational coping have a direct bearing on the amount of burnout experienced by supervisors." However, your data do not seem to support that idea.

It would have been very helpful if:

1. You would have defined, under burnout, what the term "majority of supervisors" meant. Was it 51% or 91% . . . I suspect it was closer to 51%.

2. You had included an overall burnout table and then clearly defined and described the relationship of the burnout subscales to the overall burnout table suggesting and discussing the relative weight of each subscale.

I would suspect that semantics is the major cause of problems with this paper. A few additional tables and considerably better descriptions and discussions of subscales and their relationship to the overall indicator variables would remove questions about the results and prevent the reader from making incorrect conclusions.

Directing Future Research Efforts in Agricultural and Extension Education through a Matrix*

by

John R. Crunkilton

Remember the Count on Sesame Street. He was always counting. All he needed was a reason, and he would start counting. In many ways, we are no different. We as a society and human beings count all the time, all things, and in all different ways. Before this Conference is over, somebody will say, "there were 120 people in attendance, 90 papers were submitted and 20 were selected, or you have just 20 minutes to make your presentation." But before anybody can count anything, several basic decisions must be made. What is to be counted, but more basic, what defines, describes, or explains the items or things to be counted. In other words, does the item, situation, or data to be counted meet or fall within the boundaries of what is to be counted?

Now, how does this relate to my presentation. Last year, Larry Arrington asked if I would give the keynote address at the Southern Agricultural Education Research Conference and he wanted me to pick up where Bob Warmbrod left off several years ago in a keynote address at our conference entitled "Priorities for Continuing Progress for Research in Agricultural Education." Even the year before in Alabama, Dave William's keynote address was titled "Future Research Needs for Improving Vocational Teacher Education Programs." Larry asked if I could be more specific as to the status of our past research, which could then lead us to where the gaps were and where we should or could be going in the future. After our Regional Research Conference, I shared my paper with Ed Yoder for his consideration at this Conference.

Before I could give my paper in Florida, I had to do some counting. And before I could even start my counting exercise, I had to establish some guidelines or categories as to what and how to count our research efforts. I soon discovered that placing research conducted in Agricultural and Extension Education into neat little categories was not easy. My process is not perfected and I'll point out areas where potential problems exist and you may identify other problems that have not occurred to me. One difference between my paper in Florida and today is that in Florida, I combined the research studies in agricultural extension and agricultural education into one analysis. For what I will present today, I have separated these studies based upon the suggestions I received at the earlier conference. At the end of my remarks today, I'll offer some observations and recommendations as to what we might want to consider or do in the future.

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*Presentation at the National Agricultural Education Research Meeting, St. Louis, Missouri, December 3, 1988

I ask that you bear with me for the next few minutes. You may disagree with what I have done or with the descriptors I used. What I really want you to focus on is the design of the matrix and given the limitations of my matrix, look at the findings of my counting exercise.

First, lets deal with the research studies in Agricultural Education with the source being the Summaries of Research and Development Activities in Agricultural Education for the years 1981-1987. My matrix for research studies in Agricultural Education has descriptors on three sides that were used to categorize the research. (transparency) On the left is what I call "Program Level." This side of the matrix identifies at what program level the research was conducted --elementary school, junior high, senior high, post-secondary/adult, or university. Sometimes studies fell very neatly into a category, other times I had to make a decision as to what was the major thrust or emphasis of the study. For example, if a study indicated secondary vocational agriculture programs, I placed it in the senior high level realizing that in some states 9th grade agriculture could be considered a junior high offering. Guidelines I used to categorized studies were: (transparency)

Elementary - studies involving only grade levels before junior high or middle school
Junior high - an indication had to be given that the study was restricted to junior high or the middle school only
Senior high - studies placed in this category used the term secondary programs or high school in the abstract
Post secondary/adult - these studies had to be related to an agricultural program for adults connected with the local school
University - studies which focused upon four year institutions

On top of the matrix is the "Area of Focus." These categories really describe the agricultural education program component, or what exactly was the study's focus. For example, administration/ supervision, curriculum development, pedagogy, special needs, facility/instructional resources, supervised experience programs, leadership, inservice, or evaluation. You might disagree with my categories and even I changed my mind several times. I had to decide upon my own categories since the Summaries of Research Studies in Agricultural Education have not been consistent over the years in the subject index at the end of the publications. Guidelines I used to make decisions for this part of my matrix were as follows. (transparency)

Administration/supervision - studies dealing with management decisions and supervising activities
Curriculum development - all studies dealing with program planning content selection, needs assessment, and curriculum materials
Pedagogy - studies that dealt with teaching methodology
Special needs - the focus for these studies had to be upon the student population described as special needs (disadv., hcd)
Facility/instructional resources - equipment, facilities, and those inputs that help to contribute to a conducive environment for effective education
Supervised experience programs - any study that focused upon conducting or supervising occupational experience programs
Leadership - studies that focused upon the FFA and other youth leadership activities
Inservice education - studies that were concerned with the professional development of practicing teachers
Evaluation - research efforts that were testing models of evaluation or were assessing the effectiveness of program components not classified elsewhere in the matrix

The third side of the matrix categorized the studies as to their scope, or what was the range of the study.(transparency) My categories ranged from local (meaning something less than a statewide study); to statewide (the study had to have statewide data collection or indicated a state randomization process); regional (meaning two or more states were involved); national (implying that all states were involved or at least through randomization the opportunity was there for all states to be involved); and international (another country was the central focus of the study).

This is my matrix, a configuration with 225 cubby holes or slots to place research studies. Again, you might disagree with my matrix, descriptors, and classification of some studies. For example, I did not include technical agriculture studies reported in the Summaries of Studies on this matrix, but chose to place them on the Extension matrix which I will discuss in a few minutes. An example of this type of study is "Determining the Best Conservation Practices for Ten Percent Slope of Land." Another example of studies ommitted was vocational education that was reported in the Summaries of Study.

With these limitations and using the matrix just described, let me share with you where the studies in Agricultural Education fall. Any guesses? Time did not permit me to review all listings of agricultural education research or for a long period of time. For this presentation today, I used the Summaries of Research and Development Activities in Agricultural Education for the last six years, specifically 1986-87, 1985-86, 1984-85, 1983-84, 1982-83 and 1981-82. We must also realize that neither all studies conducted in the U.S. are reported in these publications, nor did I cross reference the studies reported at NAREM with the abstracts reported in the Summary of Studies to see if any studies have been ommitted.

Well, what cells did we fill or another way to look at it, what cells have cobwebs in them? With this matrix, anybody could develop a perspective of the research conducted nationwide, which I'll share with you in a second, or by institution, which I did for Virginia Tech, or by regions(which I did not do).

In Table 1, 675 studies were classified by program level. Studies conducted at the senior high level comprised about 67 percent of the total conducted, with the next highest level being university with 18 percent. Elementary and junior high studies combined for less than 1 percent of the studies. We might also conclude that no particular trends over the years can be identified.

Table 2 summarizes the studies by area of focus. When all six years are considered and of the 675 studies, the area of curriculum development amounted to 41 percent of the studies and administration/supervision about 24 percent. The area of special needs represented about 1 percent of the studies completed. We might say studies in the areas of curriculum development and supervised experience programs are decreasing of the total percentage of all studies conducted, while pedagogy studies are increasing.

The data in Table 3 show that about 54 percent of the 675 studies were statewide, while local studies were the next most occurring studies with about 24 percent. Regional studies amount to only about 3 percent of the total conducted. We might conclude here that trends are hard to identifiy.

If we were to place all 675 studies on the matrix as illustrated in Figure 1, you can see where our studies tend to group; statewide studies at the senior high level in curriculum development, and statewide studies at the senior high level in administration/ supervision. You can also see many empty spaces indicating other research possibilities. Another conclusion we could draw is that the research in agricultural education is focused, but that focus has come about more by accident rather than through planned activities.

Furthermore, Table 4 helps to point out additional information about our studies and efforts. On the average over six years, we have used about 39 (17 percent) of the total 225 cells, about 26 states(52 percent) have reported studies, and only 29 of 90 universities(32 percent) have reported research studies.

As I had indicated earlier, we can also take a look at ourselves, so let's select Virginia Tech for the sake of discussion. For Virginia Tech, Table 5, our studies have centered around the senior high school and avoided junior high and elementary schools; in the area of focus, more studies in administration/supervision but nothing on special needs, SOE or evaluation; and in scope, state and national studies combined make up two-thirds of the studies.

With these findings, I am not saying what is good or bad for either Virginia Tech or our profession. I believe we need to ask, "Are these the areas of research we should be conducting?" or if the faculty in a particular institution decides they want to be known for a particular research area, "How well are they doing?"

Now for the next few minutes let's turn our attention to those studies identified as agricultural extension. The studies that I have reviewed are those that were reported by the Summary of Research in Extension series published by Mississippi State University over the last few years. In fact I went back to the first volumn that covered the time period 1980-83 and ended up with Volume 3 1986-87. My job was easier when I looked at extension studies because in those three volumes, the staff at Mississippi State developed categories for reporting the studies. A committee reviewed these abstracts and placed them in eight different categories and thus, I used those categories in helping to classify the study. However, I did make a judgement on the scope of the study. Thus we have a two sided matrix for reporting studies in extension.

First let's look at the scope. I divided the different categories for scope into county, several counties, state, regional, national, and international. Some of my guidelines for placing the studies into these different categories were as follows:

County - these studies were restricted to a certain county within the state.

Several counties - This was a category which I did not have in the agricultural education matrix because many times extension is organized by districts within the state and studies are conducted within those districts Thus, I classified studies that were beyond one county but less than statewide in this category.

State - Similiar to agricultural education, these studies had to have either a population representing the whole state or at least a random sample of that population.
Regional - Studies that involve one or more states but less than national in scope.
National - Studies that involved at least a representation from all states or at least the opportunity for representation.
International - Studies that dealt with countries other than the United States.

At the top of the chart was the "area of focus" and these were the categories already identified in the Summary of Research in Extension publications. The categories for the area of focus were administration, communications/ delivery methods, community resource development, evaluation/ accountability, 4H/Youth, personnel/staff development, volunteerism, and agriculture. I cannot share with you the rationale for placing studies within each of these categories but relied on the professional judgment of those in Mississippi. At first, I omitted the category of agriculture because many of those studies dealt with technical agriculture. However, upon reviewing the abstracts, many of these studies would have implications for effective extension education methods, particularly the dissemination of new ideas and technology to agriculturalists. In the end, I did include the agricultural category, however, I did not include studies in home economics reported in these publications. The three publications reviewed represented a period of about seven years.

Well, do you have any guesses on extension education type of studies? As we can see from this transparency, approximately 46% of the studies conducted over the last seven years were statewide in scope, with county and international level studies being the next most popular studies. Only about 3% of the studies were regional in scope.

If we look at studies by area of focus, the category with the largest number was agriculture with about 25% of the 564 studies. This may not be too surprising since we as agricultural educators have not been focusing our attention in the area of extension until recent years. Thus many of these studies were probably conducted by professionals other than teacher educators. The second most popular category was in the area of personnel/staff development with about 20% and only about 4% of the studies were community resource development.

With these data, it would be hard to identify any trends over the years as presented here, unless it would be for communication/ delivery methods which has shown an increase in the percentage of the total studies reported.

If we look at the number of cells used, about two thirds of the cells have research studies reported and about 56% of the states have reported.

Again, if we look at an example within Virginia for studies reported, about a third of them have been evaluation/ accountability and none in community resource development. Our studies have had a tendency to be statewide in scope with no regional or international studies reported.

If we take a look at figure 2, a review of the matrix with the numbers of studies placed on the chart indicate that most of our studies are statewide in scope in the area of personnel/staff development with the next most popular category being countywide in scope in the area of agriculture. As you can see, there are also a few slots within the matrix where there were no studies reported.

In conclusion I experienced what Gary Moore did when he reported "Dissertations on Disk" about two years ago. One thing I found was that in many cases I could not classify the studies by titles alone or at least I had problems feeling confident in what I was doing. In many cases, I had to read the abstracts through the entire purpose, objectives and in some cases into the conclusions to really find out what the study was all about. With this type of experience plus the information I have shared with you, let me offer the following for your reflections or perhaps comments as to where we might go from here.

1. If we as a profession want to chart a course for our research, and members of our profession have indicated that we need to develop research priorities and directions for the profession, then we need some type of framework that will show us where we have been, where we can or should go; as individual professional researchers, as institutions, and as a total profession. Whatever this framework might be, it should be a framework that is easy to follow, clear to all, and where the amount of judgments as to where studies will fall become less subjective and more objective.

2. As an outgrowth of my first comment, if we are to continue publishing the Summaries of Research and Development Activities in Agricultural Education and the Summary of Research in Extension, then I would suggest that somebody try to work out terminology for classification of studies. This will help to provide a better understanding

of the research completed, aid in the review of literature for our total profession, and give us better direction for determining where we should go for our research..

3. If you notice the titles of the two publications that I have used for this exercise, Agricultural Education uses "Research and Development Activities," while Agricultural Extension used just "Research." What role does development activities play in our total efforts of improvement in our profession and should completed extension development activities be reported?

4. Relating to my comments on the abstracts, it is quite evident that we need inservice education on how to prepare abstracts. Perhaps it would be well if somebody would write an article, or NAERM or the Research Committee of the Agricultural Education Division would take it upon themselves to develop guidelines on what information should be in an abstract. In reviewing some of the abstracts, it was hard for me to tell whether the samples were randomly drawn or the exact nature of the population. To me, each abstract of a research study ought to contain at least a minimal amount of information and my question would be "what should be the bare essentials of an abstract. Also, avoid all abbreviations in abstracts unless they have been defined. There were some abbreviations used which I have no idea what those abbreviations stood for.

5. Either a central location or some clearing house for research in agricultural education and extension should be developed if we really want to develop a research agenda for our profession. This would be a place where research that was completed could be reported as well as research underway. Doctoral and masters students, as well as faculty members could tap into the system to find out which cells were empty in a matrix like this or to find out what studies have been conducted or are in process. With the current computer age technology, this is certainly feasible; however, it will take some resources to accomplish.

6. The profession must be willing to take more time to report the research completed. In agricultural education, with only 52 percent of the states reporting and only 32 percent of the institutions, and in Extension with 56 percent of the states reporting, I have a feeling that some research is not being reported; OR if this is really the case, then we have some colleagues, institutions, and states that must be encouraged to become more active in the research area. Even though the numbers and percentages only reflect a narrow slice of time and even with some missing data, the information just shared with you does give us an idea of what we are and are not doing.

7. One practice I followed was that I eliminated studies that dealt with vocational education. I raise this as a concern with you because no doubt, within some of those vocational education studies agricultural education was a part. My question is "should vocational education studies including agricultural education be reported in any type of counting exercise?" If so, then how?

8. We have some cells that are empty. Are these legitimate research areas for us to consider? And as a profession, which cells are more important to our program today and in the years ahead? The answer to this last question could vary by institution, state, and individual. And also as one person raised at the Southern Agricultural Education Research Conference, when you develop a matrix like this is it really futures oriented. In other words, are there new research areas that should be studied and this type of matrix would tend to discourage us from being creative thinkers and looking at other research areas for the future.

9. Perhaps we also need more people in our profession who would take research and development activities completed and synthesize the findings of all studies that are related. For example, SOEP and curriculum development already has plenty of studies in agricultural education, and in extension, staff and personnel development. Perhaps it would be benefical if somebody could write a handbook of research in agricultural education similiar to the Handbook on Research on Teaching and Learning to synthesize our studies. Perhaps we have researched some of these cells to the point of diminishing returns and now we need to move to other cells. Would it be useful to take all these research studies reported in a specific cell and synthesize the findings into meaningful outcomes and suggestions for us in the profession?

Other questions that could be raised are:

- Since very few studies have been conducted at the elementary and junior high levels and the National Study in calling for more agricultural literacy, should we spend more time conducting studies at these grades?

- Many of the studies at the secondary level also included students in the 8th and 9th grades. Are students different enough to suggest that we separate these students out from the senior high grades when conducting research?

- Many new directions for our program have been put forth in the recent National Study. Will the research findings from our traditional programs be relevant for these new directions?

- Should we be conducting more studies at the local levels?

- The matrix used relects what has been. While this information is valuable, does it help direct our attention where research is most needed?

- Studies in community resource development are few in number. Does this represent an area for collaborative research between teacher educators and extension staff?

One final word. Again, I do not share this matrix today with you as a perfect model, or as the ultimate procedure that will solve our problems or give us concrete directions for research and development activities in agricultural education. But you can help determine if the matrix idea does have merit for us to consider. Furthermore, even with the limitations that I have shared with you throughout my remarks, the numbers and percentages do give us an idea of where we have been devoting our energies and are we as effective and efficient as we might be?

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Table 1
Agricultural Education Studies by Program Level and Year

	Year						
Program Level	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	Total
Elementary	0 -	0 -	0 -	1 (0.9)	0 -	1 (0.9)	2 (0.3)
Junior High	1 (0.9)	1 (0.8)	0 -	0 -	1 (0.8)	1 (0.9)	4 (0.6)
Senior High	83 (77.6)	79 (66.9)	76 (69.7)	76 (69.1)	68 (58.6)	73 (63.5)	455 (67.4)
Post Sec/Adult	8 (7.5)	17 (14.4)	13 (11.9)	7 (6.4)	29 (25.0)	17 (14.8)	91 (13.5)
University	15 (14.0)	21 (17.8)	20 (18.3)	26 (23.6)	18 (15.5)	23 (20.0)	123 (18.2)
Total	107	118	109	110	116	115	675

( ) denote percentages

Table 2
Agricultural Education Studies by Area of Focus and Year

	Year						
Area of Focus	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	Total
Administration/ Supervision	21 (19.6)	25 (21.2)	31 (28.4)	27 (24.5)	28 (24.1)	28 (24.3)	160 (23.7)
Curriculum Development	53 (49.5)	55 (46.6)	46 (42.2)	45 (40.9)	50 (43.1)	28 (24.3)	277 (41.0)
Pedagogy	5 (4.7)	5 (4.2)	6 (5.5)	6 (5.5)	13 (11.2)	20 (17.4)	55 (8.1)
Special Needs	1 (0.9)	4 (3.4)	1 (0.9)	1 (0.9)	1 (0.9)	0 -	8 (1.2)
Facilities/ Resources	1 (0.9)	4 (3.4)	5 (4.6)	7 (6.4)	5 (4.3)	1 (0.9)	23 (3.4)
SOE	9 (8.4)	14 (11.9)	9 (8.3)	9 (8.2)	9 (7.8)	8 (7.0)	58 (8.6)
Leadership	11 (10.3)	5 (4.2)	6 (5.5)	9 (8.2)	6 (5.2)	7 (6.1)	44 (6.5)
Inservice	6 (5.6)	5 (4.2)	3 (2.8)	6 (5.5)	2 (1.7)	2 (1.7)	24 (3.6)
Evaluation	0 -	1 (0.8)	2 (1.8)	0 -	2 (1.7)	21 (18.3)	26 (3.9)
Total	107	118	109	110	116	155	675

( ) denote percentages

Table 3
Agricultural Education Studies by Scope and Year

	Year						
Scope	1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	Total
Local	29	25	19	29	26	35	163
	(27.1)	(21.2)	(17.4)	(26.4)	(22.4)	(30.4)	(24.1)
State	57	65	66	55	59	63	365
	(53.3)	(55.1)	(60.6)	(50.0)	(50.9)	(54.8)	(54.1)
Regional	2	3	3	6	1	3	18
	(1.9)	(2.5)	(2.8)	(5.5)	(0.9)	(2.6)	(2.7)
National	8	6	8	11	14	8	55
	(7.5)	(5.1)	(7.3)	(10.0)	(12.1)	(7.0)	(8.1)
International	11	19	13	9	16	6	74
	(10.3)	(16.1)	(11.9)	(8.2)	(13.8)	(5.2)	(11.0)
Total	107	118	109	110	116	115	675

( ) denote percentages

Table 4
Selected Data for Agricultural Education Studies by Year

Selected Data	Year 1981 1982	1982 1983	1983 1984	1984 1985	1985 1986	1986 1987	Total
Cells Used	31 (13.8)	40 (17.8)	33 (14.7)	45 (20.0)	45 (20.0)	40 (17.8)	39 (17.3)
States Reporting	26 (52.0)	28 (56.0)	26 (52.0)	26 (52.0)	29 (58.0)	23 (46.0)	26 (52.0)
Universities Reporting	26 (28.9)	31 (34.4)	27 (30.0)	31 (34.4)	35 (38.9)	25 (27.8)	29 (32.2)

( ) denote percentages

Table 5
Six Years of Research and Development Activities at Virginia Tech

Program Level	N	%
Elementary	0	-
Junior High	0	-
Senior High	18	60.0
Post Secondary/Adult	1	3.3
Extension	2	6.7
University	9	30.0
	30	100.0
Area of Focus	N	%
Administration/Supervision	17	56.7
Curriculum Development	5	16.7
Pedagogy	3	10.0
Special Needs	0	-
Facilities/Resources	1	3.3
SOE	0	-
Leadership	2	6.7
Inservice	2	6.7
Evaluation	0	-
	30	100.1
Scope	N	%
Local	4	13.3
State	10	33.3
Regional	2	6.7
National	11	36.7
International	3	10.0
	30	100.0

Table 6
Agricultural Extension Studies by Scope and Year

Scope	Year 1980-83	 1983-85	 1986-87	Total
County	31 (20.5)	41 (20.7)	34 (15.8)	106 (18.8)
Several Counties	13 (8.6)	17 (8.6)	22 (10.2)	52 (9.2)
State	76 (50.3)	81 (40.9)	103 (47.9)	260 (46.1)
Regional	6 (4.0)	3 (1.5)	8 (3.7)	17 (3.0)
National	4 (2.6)	8 (4.0)	15 (7.0)	27 (4.8)
International	21 (13.9)	48 (24.2)	33 (15.3)	102 (18.1)
Total	151	198	215	564

( ) denotes percentages

Table 7
Agricultural Extension Studies by Area of Focus and Year

Area of Focus	Year 1980-83	 1983-85	 1986-87	Total
Administration	13 (8.6)	16 (8.1)	16 (7.4)	45 (8.0)
Communications/ Delivery Methods	10 (6.6)	20 (10.1)	40 (18.6)	70 (12.4)
Community Resource Development	3 (2.0)	12 (6.1)	9 (4.2)	24 (4.3)
Evaluation/Accountability	18 (11.9)	17 (8.6)	25 (11.6)	60 (10.6)
4H/Youth	25 (16.6)	34 (17.2)	22 (10.2)	81 (14.4)
Personnel/Staff Development	38 (25.2)	39 (19.7)	34 (15.8)	111 (19.7)
Volunteerism	6 (4.0)	11 (5.6)	17 (7.9)	34 (6.0)
Agriculture	38 (25.2)	49 (24.7)	52 (24.2)	139 (24.6)
Total	151	198	215	564

( ) denotes percentages

Table 8
Selected Data for Agricultural Extension Studies by Year

Selected data	Year 1980-83	1983-85	1986-87	Mean
Cells Used (Max - 48)	29 (60.4)	30 (62.5)	37 (77.0)	32 (66.7)
States Reporting	20 (40.0)	33 (66.0)	30 (60.0)	28 (56.0)

Table 9
Agricultural Extension Studies in Virginia from 1980-1986

Area of Focus	N	%
Administration	1	7.7
Communications/Delivery Methods	1	7.7
Community Resource Development	0	-
Evaluation/Accountability	4	30.8
4H/Youth	1	7.7
Personnel Staff Development	2	15.4
Volunteerism	1	7.7
Agriculture	3	23.1
	13	100.1
Scope		
County	2	15.4
Several Counties	1	7.7
Statewide	8	61.5
Regional	0	-
National	2	15.4
International	0	-
	13	100.0

AREA OF FOCUS

PROGRAM LEVEL	SCOPE	Adm/sup	Cur Dev	Pedagogy	Spec Needs	Facilities	SOE	Ldship	In-Ser	Eval
Elementary	Local		1							
	State		1							
	Regional									
	National									
	International									
Junior High	Local		1							
	State		2							
	Regional									
	National									
	International		1							
Senior High	Local	11	37	7	2	4	11	9		3
	State	63	112	24	4	12	40	21	15	7
	Regional	3	2				4	2	1	
	National	13	3	2		3	1	10	1	
	International	8	17	1					2	
Post-Secondary Adult	Local	3	18	3					2	1
	State	14	22	4			1	1		4
	Regional	1	1	1						
	National								1	
	International	3	10			1			1	
University	Local	15	15	10	1	2	1		1	6
	State	3	10	1		1		1		2
	Regional	1	1	1						
	National	15	3	1	1					1
	International	7	20	2						1

Area of Focus

SCOPE	Adm.	Comm/ Del.Meth.	CRD	Eval/ Acct.	4H/Youth	Per. Staff Dev.	Volunt.	Agr.
County	-	9	10	3	19	-	2	63
Several Counties	-	2	2	6	11	2	4	25
State	16	22	6	37	47	77	24	31
Regional	3	2	1	1	2	4	-	4
National	3	1	2	5	2	5	4	5
International	23	34	3	8	-	23	-	11